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# NASA TECHNICAL MEMORANDUM

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Revision 2

## THE OCTOBER 1973 EXPENDABLE LAUNCH VEHICLE TRAFFIC MODEL

By Shuttle Utilization Planning Office  
Program Development

January 1974

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Traffic model data for current expendable launch vehicles (assuming no Space Shuttle) for calendar years 1980 through 1991 are presented along with some supporting and summary data. This model was based on a payload program equivalent in scientific return to the October 1973 NASA Payload Model, the NASA estimated non NASA/non DoD Payload Model, and the 1971 DoD Mission Model.

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## TABLE OF CONTENTS

	Page
SUMMARY.....	1
INTRODUCTION.....	1
GROUND RULES.....	15
GLOSSARY .....	17
EXPLANATION OF COLUMN HEADINGS FOR CARGO MANIFEST .....	25
APPENDIX -- EXPENDABLE LAUNCH VEHICLE FLEET CHARACTERISTICS .....	85

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## LIST OF TABLES

Table	Title	Page
1.	1973-1991 Total Expendable Payload Summary .....	2
2-A.	Equivalent Payload Schedule (Astronomy Program) .....	3
2-B.	Equivalent Payload Schedule (Physics Program) .....	4
2-C.	Equivalent Payload Schedule (Planetary Exploration Program).....	5
2-D.	Equivalent Payload Schedule (Lunar Exploration Program)...	6
2-E.	Equivalent Payload Schedule (Life Sciences Program) .....	7
2-F.	Equivalent Payload Schedule (Earth Observation Program)...	8
2-G.	Equivalent Payload Schedule (Earth and Ocean Physics Application Program) .....	9
2-H.	Equivalent Payload Schedule (Communications and Navigation Program).....	10
2-I.	Equivalent Payload Schedule (Space Processing Program) ...	11
2-J.	Equivalent Payload Schedule (Space Technology Program) ...	12
2-K.	Equivalent Payload Summary (Non-NASA/Non-DoD Payloads).....	13
2-L.	Equivalent Payload Schedule (Sortie Equivalent - Space Station) .....	14
3.	Expendable Launch Vehicles and Expendable Payloads, Supplementary Sounding Rocket and Balloon Requirements (Sortie Equivalent) .....	23
4.	Expendable Launch Vehicle Nomenclature .....	24
5.	Expendable Launch Vehicle Cargo Manifest .....	27

## LIST OF TABLES (Concluded)

Table	Title	Page
6.	Expendable Launch Vehicles and Expendable Payloads Summary Schedule, NASA and Non-NASA/Non-DoD.....	83
7.	Expendable Launch Vehicles and Expendable Payloads Summary Schedule, Total.....	84
A-1.	Description and Characteristics of the Expendable Launch Vehicles Used.....	86

## THE OCTOBER 1973 EXPENDABLE LAUNCH VEHICLE TRAFFIC MODEL

### SUMMARY

Traffic model data for current expendable launch vehicles (assuming no Space Shuttle) for calendar years 1980 through 1991 are presented along with some supporting and summary data. This model was based on a payload program equivalent in scientific return to the October 1973 NASA Payload Model, the NASA estimated non-NASA/non-DoD Payload Model, and the 1971 DoD Mission Model.

This document is intended for NASA planning purposes only. The payload data in this document do not represent approved program information. The data were generated for comparison purposes in the economic analysis of the Space Transportation System (Space Shuttle and Tug) and the primary payload carrier, the Sortie Lab.

### INTRODUCTION

Current expendable launch vehicles and their derivatives are used to capture the NASA, Non-NASA/Non-DoD, and DoD payload models. The current expendable payload model (Tables 1 and 2) was derived by deleting those missions which are considered to be Space Shuttle benefits (sorties, revisits) and by adding extra satellites to maintain consistent program objectives and life without revisit or in-orbit maintenance and refurbishment flights. The sortie equivalent missions were selected based on the most cost-effective approach to accomplish the same scientific objectives.

The automated missions were captured with Scout, Delta, and Titan launch vehicles and their derivatives. Multiple payloads were flown together when consistent with performance and size constraints. DoD payloads were not flown with non-DoD payloads.

The best mix payload weights listed in the manifest will not necessarily agree with the weights listed in the 1973 NASA Payload Model due to the low cost designs used in the best mix payloads.

The launch vehicle fleet utilized in this analysis is described in the Appendix.

TABLE 1. 1973-1991 TOTAL EXPENDABLE PAYLOAD SUMMARY

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	Total
<u>NASA</u>																				
Automated	6	8	7	8	12	9	15	22	21	13	13	17	22	21	19	13	16	19	17	278
Sortie Equivalent	0	0	0	0	0	0	0	7	4	6	5	9	8	11	9	7	6	12	6	90
Total	6	8	7	8	12	9	15	29	25	19	18	26	30	32	28	20	22	31	23	368
<u>Non-NASA/Non-DoD</u>																				
Automated	6	10	10	8	9	13	7	8	10	9	10	8	9	12	6	19	9	17	8	188
Sortie Equivalent	0	0	0	0	0	0	0	2	1	3	3	3	3	4	2	3	2	3	1	30
Total	6	10	10	8	9	13	7	10	11	12	13	11	12	16	8	22	11	20	9	218
<u>Space Station</u>																				
Sortie Equivalent (Used By Both NASA and Non-NASA/Non DoD)	0	0	0	0	0	0	0	5	5	5	5	5	5	5	5	5	5	5	5	60
<u>DoD</u>								34	18	21	32	28	25	23	25	25	25	26	21	303
Grand Total	12	18	17	16	21	22	22	78	59	57	68	70	72	76	66	72	63	82	58	949

TABLE 2-A. EQUIVALENT PAYLOAD SCHEDULE (ASTRONOMY PROGRAM)

Payload Code	Payload	CY	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	Total
	Automated Spacecraft																					
AST-1	Explorers	(2)	(1)	(2)	(1)	(1)	(2)	1	2	1	1	2	1	2	1	2	1	1	1	1	1	26
AST-2	Orbiting Solar Obs.				(1)																	1
AST-3	Solar Max Satellite					1				1		1		1		1		1		1		7
AST-4	High Energy Astr. Obs. A-C					(1)	(1)	(1)	1													4
	Large Observatories																					
AST-5	High Energy Astr. Obs. D+E									1			1		1		1		1			5
AST-6	Large Space Telescope									1		1	1		1		1		1			6
AST-7	Large Solar Obs													1		1		1		1		4
AST-8	Large Radio Obs.													1		1		1		1		4
AST-9A	Focusing X-Ray Telescope											1				1				1		3
AST-9B	Focusing X-Ray Telescope												1				1					2
	Total Autom.		2	2	2	2	3	3	1	5	1	4	3	4	5	4	5	4	4	4	4	62
	Sortie Equivalent Payloads																					
AST-10(1)	Infrared Astr.									1		1		1		1		1		1		6
AST-10(2)	Infrared SM Telescope										1				1				1			3
AST-10(3)	Ultraviolet ASTR-IM											1		1		1		1		1		4
AST-10(4)	UV ASTR Survey											1								1		2
AST-10(5)	X-Ray & UV Astr.												1			1		1		1		3
AST-10(6)	Explorer										1		1	1	1	1	1	1	1	1		9
AST-11	Solar Physics - EOSO									1		1		1		1		1		1		6

Note:  Approved and Ongoing

TABLE 2-B. EQUIVALENT PAYLOAD SCHEDULE (PHYSICS PROGRAM)

Payload Code	Payload	CY	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	Total
PHY-1	<u>Automated Spacecraft</u>																					
PHY-1	Explorers		(2)	(1)	(2)	(1)	(2)	(1)	2	1	2	1	1	2	1	1	1	2	2	2	2	29
PHY-2	Grav. & Rel. Sat.									1			1				1				1	4
PHY-3	Environ. Perturb. Sat.										1			1			1			1		4
PHY-4	Helio. & Interstel. S/C																	1				1
PHY-5	<u>Large Observatories</u>																	1	1	1	1	3
PHY-5	Cosmic-Ray Laboratory																	1	1	1	1	3
	Total Autom.		2	1	2	1	2	1	2	2	3	1	2	3	1	2	3	3	3	3	4	41
PHY-6	<u>Sortie Equivalent Payloads</u>										1			1	1	1		1				4
PHY-7(1)	Cosmic X-Ray Exper.											1		1				1				3
PHY-7(2)	MHD Exper.												1		1	1		1				4
PHY-7(3)	Particle Inject Exper.													1				1				2
PHY-7(4)	Atmospheric Science																1			1		2
PHY-7(5)	Auroral Observation																2	2		2		6
	Chemical Release																					

Note:  Approved and Ongoing

TABLE 2-C. EQUIVALENT PAYLOAD SCHEDULE (PLANETARY EXPLORATION PROGRAM)

Payload Code	Payload	CY 73 74 75	76 ①	77 ①	78 ②	79	80 81 82 83	84 85 86 87	88 89 90 91	Total
PL-1	Approved Programs									1
PL-2	Mariner Venus/Mercury									0
PL-3	Pioneer Jupiter Flyby									2
PL-4	Helios									2
PL-5	Viking 75									2
	Mariner Jup/Sat 77									2
PL-6	Inner Planets									1
PL-7	Viking Orbiter/Lander 79						1			1
PL-8	Surface Sample Return							2		2
PL-9	Satellite Sample Return									2
PL-10	Pioneer Venus									2
PL-11	Inner Pl. Follow-On									5
PL-12	Venus Radar Mapper									2
PL-13	Venus Buoyant Station									2
PL-14	Mercury Orbiter									2
	Venus Large Lander									2
PL-15	Outer Planets									2
PL-16	Mariner Jup/Uranus Flyby						2			1
PL-17	Pioneer Jup/Uranus Flyby (Uranus Probe)						1			1
PL-18	Pioneer Saturn Probe							1		1
PL-19	Pioneer Sat/Uranus Flyby (U Probe)							2		2
PL-20	Mariner Jupiter Orbiter									2
PL-21	Pioneer Jupiter Orbiter									2
PL-22	Mariner Saturn Orbiter									2
PL-23	Mariner Uranus/Nep Flyby									2
	Jupiter Sat. Orb/Lander									2
PL-24	Comets & Asteroids									1
PL-25	Dual Comet Flyby									1
PL-26	Encke Slow Flyby									2
PL-27	Encke Rendezvous									1
PL-28	Halley Flyby									2
	Asteroid Rendezvous									2
	Total	1 1 2	2 ①	2 ①	2 ②	5	2 7 0 3	4 5 5 2	0 2 2 2	49

C7

Note:  Approved and Ongoing  
 Launched

TABLE 2-D. EQUIVALENT PAYLOAD SCHEDULE (LUNAR EXPLORATION PROGRAM)

TABLE 2-E. EQUIVALENT PAYLOAD SCHEDULE (LIFE SCIENCES PROGRAM)

TABLE 2-F. EQUIVALENT PAYLOAD SCHEDULE (EARTH OBSERVATION PROGRAM)

Payload Code	Payload	CY	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	Total
	<u>Automated Spacecraft</u>																					
EO-1	Earth Resources Tech. Sat.					(1)																1
EO-2	NIMBUS						(1)															2
EO-3A	Earth Observatory Sat.							1					1						1			4
EO-3B	Earth Observatory Sat.								1				1					1		1		5
EO-3C	Earth Observatory Sat.									1				1				1		1		4
EO-3D	Earth Observatory Sat.									1												1
EO-4	Syn. Earth Obs. Sat.										1		1				1		2		2	9
EO-5	Special Purpose Sat.					1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	19
EO-6	TIROS								(1)				1					1				3
EO-7	Syn. Meteorological Sat.		(1)	(1)				1										1				4
	Total Autom.		1	2		2	3	3	3	3	4	3	3	2	3	2	6	2	4	2	4	52
	<u>Sortie Equivalent Payloads</u>																					
EO-8(1)	Earth Obs. Sat.										1	1	1	1	1	1	1	1	1	1	1	12

Note:  Approved and Ongoing

TABLE 2-G. EQUIVALENT PAYLOAD SCHEDULE (EARTH AND OCEAN PHYSICS APPLICATION PROGRAM)

Payload Code	Payload	CY	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	Total
	<u>Automated Spacecraft</u>																					
EOP-1	Geodetic Earth Orbiting Sat.				①																	1
EOP-2	Laser Geodynamic Sat.					①																1
EOP-3	SEASAT						1					1										2
EOP-4	GEOPAUSE							1				1										2
EOP-5	Grav. Gradiometer								1													1
EOP-6	Mini-Laser Geodynamic Sat.									6					6							12
EOP-7	GRAVSAT								1													1
EOP-8	Vector Magnetometer Sat.									3					3				3			9
EOP-9	Magnetic Monitor Sat.									1					1				1			3
	Total Autom.		1		1	1	2	7	4	2				6	4			4				32
	<u>Sortie Equivalent Payloads</u>																					
EOP-10(1)	EOPAP - Ocean Dynamics									1	1		1	1	1	1	1	1	1	1		6
EOP-10(2)	EOPAP - Earth Dynamics										1	1	1	1	1	1	1	1	1	1		6

Notes:

○ Approved and Ongoing

TABLE 2-H. EQUIVALENT PAYLOAD SCHEDULE (COMMUNICATIONS AND NAVIGATION PROGRAM)

Payload Code	Payload	CY	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	Total
	<u>Automated Spacecraft</u>																					
C/N-1	Applie. Tech. Sat.				(1)																	1
C/N-2	Coop. Applie. Sat.					(1)																1
	Total		1	1																		2
	<u>Sortie Equivalent Payloads</u>																					
C/N-4	COMM/NAV-ATS										1	1		1	1		1	1		1	1	6

Note:

Approved and Ongoing

TABLE 2-I. EQUIVALENT PAYLOAD SCHEDULE (SPACE PROCESSING PROGRAM)

Payload Code	Payload	CY	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	Total
SP-1	<u>Sortie Equivalent Payloads</u> Space Proc. Module									1					1						2	

TABLE 2-J. EQUIVALENT PAYLOAD SCHEDULE (SPACE TECHNOLOGY PROGRAM)

Payload Code	Payload	CY	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	Total
	<u>Automated Spacecraft</u>																					
ST-1	Long Duration Exposure Mod.									1	1			1	1		1	1		1	1	6
	<u>Total Autom.</u>									1	1			1	1		1	1		1	1	6
	<u>Sortie Equivalent Payloads</u>																					
ST-2	Adv. Tech. Module									1						1						2

TABLE 2-K. EQUIVALENT PAYLOAD SUMMARY (NON-NASA/NON-DoD PAYLOADS)

Payload Code		CY	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	Total	
NN/D-1	<u>Comm/Nav</u>																						
NN/D-2	International Comm.	3	1	2		1	1	1	2	3			2	3	2	2	2	6	2	3	2	30	
NN/D-3	U.S. Domestic	7	3			1	1	4	1	1	2	2	4	1	1	2	2	6	2	2	1	43	
NN/D-4	Disaster Warning									1	1				1					1		4	
NN/D-5	Traffic Management		2	1	3	2	1	3	1	2	2	1	1	1	1	1	1	1	1	1	1	17	
NN/D-6	Foreign Comm.	2	1	3		2	3	1		1	1	1	1	1	1	1	1	1	1	1	1	23	
NN/D-6	Communication R&D/Prototype													1				1				3	
NN/D-7	<u>Earth Observations</u>																						
NN/D-8	Tiros Operational Sat.	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	
NN/D-9	Environ. Monitoring Sat.									1		1	1		1	1	1	1	1	1	1	1	9
NN/D-10	Foreign Syn. Met. Sat. (2 Systems)									1	1	1	1	1	1	1	1	1	1	1	1	1	7
NN/D-11	Geosyn. Oper. Environmental Sat.	1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13
NN/D-12	Earth Resources Sat.																						
NN/D-13	Low Earth Orbit (2 Systems)									1	1	1	1	1	1	1	1	1	1	1	1	1	15
NN/D-13	Geosynchronous																	2		2		4	
NN/D-13	Foreign Syn. Earth Obs. Sat.																	1	2	1		4	
NN/D-14	<u>Earth and Ocean Physics</u>																						
NN/D-14	Global Earth & Ocean Monit. Sys.																	3	3	3		9	
	<u>Total Autom.</u>	6	10	10		8	9	13	7	8	10	9	10	8	9	12	6	19	9	17	8	188	
SP-1	<u>Sortie Equivalent Payloads</u>																						
NN/D-15	Space Proc. Module									1													2
NN/D-16a	Foreign Earth Obs.									1	1			1	1	1	1	1	1	1	1		6
NN/D-16b	Foreign Astronomy										1	1		1	1	1	1	1	1	1	1		9
NN/D-16c(1)	Foreign Atmospheric & Space Physics															1							1
NN/D-16c(2)	Foreign Comm./Nav.									1	1	1	1	1	1	1	1	1	1	1	1	1	12
NN/D-16d(1)	Foreign Solar Physics													1									1
NN/D-16d(2)	Foreign High Energy															1							1

TABLE 2-L. EQUIVALENT PAYLOAD SCHEDULE (SORTIE EQUIVALENT - SPACE STATION)

## GROUND RULES

### Payload Model

- The payload model for NASA Shuttle missions in the 1980-1991 period assumed an average NASA budget of \$3.3B (1972 constant dollars).
- Analysis based on NASA/Non-NASA/Non-DoD payloads defined in the 1973 NASA Payload Model dated October 1973.
- DoD Payload Model is August 1971 (updated), Option B.

### Automated Payloads

- Program content for NASA payloads provided by NASA discipline offices.
- Foreign program content provided by NASA discipline offices and reviewed by the European Space Research Organization (ESRO).
- Non-NASA/Non-DoD program content synthesized from discipline office interpretation of current user planning.
- Payload designs and costing utilize data base resulting from LMSC, TRW, and Aerospace analysis.

### Spacelab Payloads

- NASA Spacelab payloads derived from NASA/scientific community working groups and coordinated by the Joint User Requirements Group (JURG).
- Spacelab payloads configured to the expendable launch vehicle mode based on the most effective approach to accomplish the same scientific objectives.
- Spacelab equivalent for the expendable mode accomplished by:
  - Three-man Space Station (available in CY-1980).
  - Core station (crew, power, and general purpose lab).

- Ninety-day crew rotation.
- Experiment time equivalent to Spacelab/Shuttle time.
- T-IIM/Big "G" logistics support.
- Automated payloads.
- Sounding rockets.
- Balloons.

#### Expendable Launch Vehicles

- For automated missions: Scout, TAT, Atlas/Centaur, Titan derivatives.
- Direct operating costs reflect rate effects.

#### Launch Sites

- ETR and WTR available as required for entire time span.

#### Cost/Capture Analysis

- Low cost effects incorporated where applicable into payload designs for use for the expendable launch vehicles.
- Titan solid rocket motors to be recovered and reused in expendable launch vehicle case.
- 1980 through 1991 time span assumed for analysis.
- Post-1991 (1992-1998) payload model synthesized to avoid program "tailoff."
- Multiple payloads permitted on expendable cases.
- DoD payloads not be combined with non-DoD payloads.
- Costs include reliability effects of vehicles and payloads.
- All costs in 1972 constant dollars.

## GLOSSARY

Adv.	Advanced
Alt.	Altitude
Appl.	Applications
ASTR	Astronomy
Atm.	Atmosphere
ATS	Applications Technology Satellite
AU	Astronomical Unit (means distance from sun to earth)
Auto.	Automated
Big G	Big Gemini, manned ballistic recovery vehicle
Bio.	Biological
CDE, CE	Current Design Expendable
CDR, CR	Current Design Reusable
Comm.	Communications
CPM	Cargo Propulsion Module
CRL	Code for NASA Crew Rotation and Logistics payloads
D	DoD (Department of Defense)
deg	Degrees
Delta	Refers to Delta launch vehicle
Dem.	Demonstration
Demo	Demonstration

## GLOSSARY (Continued)

Dur.	Duration
Encke	Name of comet
Environ.	Environment
EOPAP (EOP)	Earth and Ocean Physics Applications Program
EOSO	Earth Orbiting Solar Observatory
Eq.	Equatorial
Escape	Refers to escape from solar system
Exper.	Experiment
Explorer	Small general purpose spacecraft
G	Gemini
Geopause	Satellite in Earth and Ocean Physics Applications Program
GEOS	Geodetic Satellite
GEOSYN	Geosynchronous orbit
Grav.	Gravity
HA	Height of orbit at apogee
Halo	Lunar orbiting communication satellite
HEAO	High Energy Astronomy Observatory
Helioc	Heliocentric

## GLOSSARY (Continued)

Hi	High
HP	Height of orbit at perigee
Incl. (Inc.)	Inclination
Inject.	Injection
Intelsat	Communications satellite
Interpl.	Interplanetary
Interstel.	Interstellar
IOC	Initial Operational Capability
IR	Infrared
Jup.	Jupiter
KSC	John F. Kennedy Space Center
Lab.	Laboratory
LAGEOS	Laser Geodynamic Satellite
LCE	Low Cost Expendable
L/D	Length/diameter in feet
LEO	Low Earth Orbit
LHET	Large High Energy Telescope
Log	Logistics
LRO	Large Radio Observatory
LSO	Large Space Observatory

## GLOSSARY (Continued)

LST	Large Space Telescope
Magnet.	Magnetic
Mariner	Planetary spacecraft
Max.	Maximum
Med.	Medium
Meteor. (Met.)	Meteorological
MHD	Magnetohydrodynamic
Mini	Small
Mod.	Module
Monit.	Monitoring
Nav.	Navigation
Nept.	Neptune
n. mi.	Nautical miles
N-P	Refers to mission number
OA	Code for NASA earth observation sortie equivalent payloads
Obs.	Observation
Observ.	Observatory
Oper.	Operational
Orbit (Orb.)	Altitude in nautical miles/inclination in degrees (both apogee and perigee shown for elliptical orbits)

## GLOSSARY (Continued)

OTDA	Office of Tracking and Data Acquisition
PA	Code for NASA astronomy sortie equivalent payloads
Pert.	Perturbation
P/L	Payload
Plan. (Pl.)	Planetary
Proc.	Processing
Proto.	Prototype
R&D	Research and development
Relat. (Rel.)	Relativity
Rend.	Rendezvous
Revisits	Rendezvous with orbiting spacecraft for maintenance and data retrieval
Samp.	Sample
Sat.	Satellite
Satn.	Saturn
SATS	Small Applications Technology Satellite
Sat. /Uran.	Saturn/Uranus
Scout	Refers to Scout launch vehicle
SEASAT	Seastate Satellite for ocean physics
SEOS	Synchronous Earth Observation Satellite

## GLOSSARY (Concluded)

Sortie	Spacelab (including pallet when applicable)
S.S.	Space Station
Surf.	Surface
Syn., Sync.	Geosynchronous orbit
TDRS	Tracking and Data Relay Satellite
Tech.	Technology
Telesc.	Telescope
Tiros	Meteorology satellite
Track.	Tracking
U-Probe	Uranus probe
Uran.	Uranus
U. S.	United States
UV	Ultraviolet
Varies	Refers to multiple payload destinations and/or descriptions
Viking	Mars soft lander
WTR	Western Test Range
'X'	Refers to unspecified comet mission
XUV	Extreme ultraviolet

TABLE 3. EXPENDABLE LAUNCH VEHICLES AND CURRENT EXPENDABLE PAYLOADS  
SUPPLEMENTARY SOUNDING ROCKET AND BALLOON REQUIREMENTS (SORTIE EQUIVALENT)

Payload Program	80	81	82	83	84	85	86	87	88	89	90	91	Total
Space Physics													
Sounding Rockets	2	5	10	10	11	16	11	11	11	11	16	11	128
Astrophysics													
Balloons	60	60	60	60	60	60	60	60	60	60	60	60	720
Astronomy													
Sounding Rockets	28	28	30	30	32	32	32	32	32	33	33	33	375
Solar Physics													
Sounding Rockets	22	22	22	32	32	32	42	52	52	54	54	54	470
Balloons	12	6	6	5	3	3	2	2	2	2	2	2	48
Total													
Sounding Rockets	52	58	62	72	75	80	85	95	95	98	103	98	973
Balloons	73	66	66	65	63	63	62	62	62	62	62	62	768

TABLE 4. EXPENDABLE LAUNCH VEHICLE NOMENCLATURE

Vehicle	Description
Delta 300	3 Caster II augmentation motors on standard long tank Thor with standard second stage
Delta 304	Delta 300 with TE 364-4 motor third stage
Delta 600	6 Caster II augmentation motors on standard long tank Thor with standard second stage
Delta 604	Delta 600 with TE 364-4 motor third stage
Delta 900	9 Caster II augmentation motors on standard long tank Thor with standard second stage
Delta 904	Delta 900 with TE 364-4 motor third stage
TIIIB	2 stage standard Core I and II
TIIIB/A	TIIIB with Agena added
TIIIC	Two 5-segment, 120-in. solids, standard Core I and II, transtage
TIIID	TIIIC with transtage removed
TIIID/C	TIIID with Centaur added
TIIID/BII	TIIID with Burner II added
TIIID7	Two 7-segment, 120-in. solids, stretched Core I and standard Core II
TIIID7/C	TIIID7 with Centaur added
TIIID7/BII	TIIID7 with Burner II added
TIIID7/C/BII	TIIID7 with Centaur and Burner II added
TIIIB/C/BII	TIIIB with Centaur and Burner II added
TIIIM	Man-rated TIIID7
Scout	4-stage solid

## EXPLANATION OF COLUMN HEADINGS FOR CARGO MANIFEST

<u>Heading</u>	<u>Explanation</u>
FLIGHT NO.	Flight number, a number used purely for reference and does not indicate the launch sequence. A "D" following the flight number indicates a DoD flight.
LAUNCH SITE	Launch site; KSC, Kennedy Space Center; WTR, Western Test Range.
LAUNCH VEHICLE	Vehicle used to launch payload.
CODE	Payload code. ( ) Payload Subgroup
NAME	Payload name.
TYPE	Payload type.  CDE — Current design expendable LCE — Low cost expendable
WEIGHT	Payload launch weight in lb.
L/D	Payload length and diameter in feet.
ORBIT HA/HP/INC	Payload orbit:  HA - Apogee in n. mi. HP - Perigee in n. mi. INC - Inclination in degrees
CARGO WEIGHT	Sum of all payload weights.
CARGO LENGTH	Sum of lengths of all payloads.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
1	KSC	TIID/C	NN/D-4	Traffic Management	CE	703	12.0/7.2	Syn. Eq.		
			NN/D-4	Traffic Management	CE	703	12.0/7.2	Syn. Eq.		
2	KSC	TIID/C	NN/D-1	Intelsat	CE	3 988	9.8/8.3	Syn. Eq.		
			EO-5A	Special Purpose Sat. Syn.	LCE	675	9.7/4.7	Syn. Eq.		
3	KSC	TIID/C	NN/D-1	Intelsat	CE	3 988	9.8/8.3	Syn. Eq.		
			NN/D-2A	U.S. Dom. Com. Sat.-A	LCE	1 057	11.1/7.6	Syn. Eq.		
4	KSC	TIID/C	NN/D-1	Intelsat	CE	3 988	9.8/8.3	Syn. Eq.		
5	WTR	Delta 300	NN/D-8	Environ. Man. Sat.	CE	1 414	13.0/8.0	920/920/103	1 414	13.0
6	WTR	Delta 300	EO-5B	Special Purpose Sat. Polar	LCE	675	9.7/4.7	3000/300/90	675	9.7
7	WTR	Scout	EOP-6C	Mini-Lageos	CE	225	1.6/1.6	350/350/90	225	1.6
8	WTR	Scout	EOP-6C	Mini-Lageos	CE	225	1.6/1.6	350/350/90	225	1.6
9	KSC	Scout	EOP-6A	Mini-Lageos	CE	225	1.6/1.6	350/350/28.5	225	1.6
10	KSC	Scout	EOP-6A	Mini-Lageos	CE	225	1.6/1.6	350/350/28.5	225	1.6
11	KSC	Scout	EOP-6B	Mini-Lageos	CE	225	1.6/1.6	350/350/55	225	1.6
12	KSC	Scout	EOP-6B	Mini-Lageos	CE	225	1.6/1.6	350/350/55	225	1.6
13	KSC	Delta 304	AST-1B	Explorer-Syn.	CE	462	9.9/2.6	19 323/19 323/28.5	462	9.9
14	KSC	TIID/BII	AST-6	LST	CE	20 639	36.3/12.0	340/340/28.5	20 639	36.3

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
15	KSC	TIIDB/C/BII	PL-10	Innerplanetary Follow-on	CE	1 857	9.0/9.0	-	1 857	9.0
16	WTR	Delta 900	Phy-2A	Gravity/Relativity Sat.-A	LCE	2 514	13.6/12.5	500/500/90	2 514	13.6
17	KSC	TIID7/C/BII	PL-17	Pioneer Saturn Probe	CE	1 329	11.0/7.0	-	1 329	11.0
18	KSC	TIID7/BII	LS-2	Life Science Module	LCE	25 700	30.0/14.0	270/270/55	25 700	30.0
19	KSC	TIIDC	AST-11	Solar Physics-EOSO	LCE	19 000	12.0/8.0	550/550/27.5	19 000	12.0
20	KSC	TIID7	SPST MOD-1	Crew Module - S.S.	LCE	20 400	45.5/14.0	270/270/55	20 400	45.5
21	KSC	TIID7	SPST MOD-2	Power Module - S.S.	LCE	20 400	58.5/14.0	270/270/55	20 400	58.5
22	KSC	TIID7	SPST MOD-3	Operations Module - S.S.	LCE	20 400	45.5/14.0	270/270/55	20 400	45.5
23	KSC	TIID7	ST-2	Advanced Technology Module	LCE	19 300	32.0/14.0	270/270/55	19 300	32.0
24	KSC	TIID7	SP-1/NN/D-15	Space Processing Module	LCE	17 400	30.0/14.0	270/270/55	17 400	30.0
25	KSC	TIID	ST-1	Long Duration Exposure Facility	CE	10 200	37.0/14.0	270/270/28.5	10 200	37.0
26	WTR	TIID	EOP-5	Gravity Gradiometer	LCE	10 236	30.2/14.7	108/108/90	10 236	30.2
27	WTR	TIIDB/C	EO-3D	EOS-D	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0
28	WTR	TIIDB/C	NN/D-16A(1)	Earth Obs.	LCE	6 635	45.0/10.0	500/500/98	6 635	45.0
29	WTR	TIIDB/C	EOP-10(1)	EOPAP-Ocean Dynamics	LCE	4 758	13.5/12.3	450/450/90	4 758	13.5
30	KSC	TIIDB/A	Phy-1C	Explorer - High Altitude	CE	720	9.0/4.0	-	720	9.0

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
31	KSC	TIIIB/A	AST-3	Solar Physics Mission	LCE	4 281	13.1/11.6	270/270/30	4 281	13.1
32	KSC	TIIIB/A	AST-4	HEAO-C	CE	6 064	18.1/9.0	250/250/28.5	6 064	18.1
33	KSC	TIIIB/A	C/N-4	Comm/Nav.	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
34	KSC	Delta 300	AST-1A	Explorer - LEO	CE	462	9.9/2.6	297/297/28.5	462	9.9
35	KSC	Delta 300	LS-1 LS-1	Life Science Module Life Science Module	LCE LCE	491 491	10.7/2.2 10.7/2.2	300/300/28.5 300/300/28.5	982	21.4
36	WTR	TIIIB/C	NN/D-11	Earth Resources Sat - LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1
37	WTR	TIIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5
38	KSC	TIIIB/A	NN/D-16 C(2)	Com/Nav	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
39	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
40	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

30

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload					Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)	
41 <sub>D</sub>	WTR										
42 <sub>D</sub>	WTR										
43 <sub>D</sub>	WTR										
44 <sub>D</sub>	WTR										
45 <sub>D</sub>	WTR										
46 <sub>D</sub>	KSC										
47 <sub>D</sub>	KSC										
48 <sub>D</sub>	KSC										
49 <sub>D</sub>	KSC										
50 <sub>D</sub>	KSC										
51 <sub>D</sub>	KSC										
52 <sub>D</sub>	KSC										

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
53 <sub>D</sub>	KSC									
54 <sub>D</sub>	KSC									
55 <sub>D</sub>	WTR									
56 <sub>D</sub>	WTR									
57 <sub>D</sub>	WTR									
58 <sub>D</sub>	WTR									
59 <sub>D</sub>	WTR									
60 <sub>D</sub>	WTR									
61 <sub>D</sub>	WTR									
62 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

32

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
1	KSC	THID/C	NN/D-9	Foreign Geosyn Met. Sat.	CE	596	8.0/6.0	Syn. Eq.	2 040	29.9
			NN/D-4	Traffic Management	CE	703	12.0/7.2	Syn. Eq.		
			NN/D-5	Foreign Com Sat.	CE	741	9.9/5.8	Syn. Eq.		
2	KSC	THID/C	NN/D-4	Traffic Management	CE	703	12.0/7.2	Syn. Eq.	1 760	23.1
			NN/D-2A	U.S. Dom. Com. Sat-A	LCE	1 057	11.1/7.6	Syn. Eq.		
3	KSC	THID/C	NN/D-2A	U.S. Dom. Com. Sat-A	LCE	1 057	11.1/7.6	Syn. Eq.	3 006	22.4
			NN/D-3	Disaster Warning Sat.	LCE	1 949	11.3/8.0	Syn. Eq.		
4	KSC	THID/C	EO-4A	SEOS R&D	LCE	5 168	13.8/12.9	Syn. Eq.	6 245	24.7
			NN/D-10	Geosyn. Oper. Met. Sat.	LCE	1 077	10.9/7.2	Syn. Eq.		
5	KSC	Delta 300	EOP-9	Magnetic Monitor Sat.	LCE	847	10.1/5.6	1080/540/28.0	847	10.1
6	WTR	Delta 300	Phy-1A	Explorer-Upper Atmosphere	CE	1 240	11.0/4.0	1900/140/90	1 240	11.0
7	WTR	Delta 300	NN/D-8	Environ. Mon. Sat.	CE	1 414	13.0/8.0	920/920/103	1 414	13.0
8	WTR	Delta 300	EO-5C	Special Purpose Sat. Polar	LCE	675	9.7/4.7	280/280/90	1 350	19.4
			EO-5C	Special Purpose Sat. Polar	LCE	675	9.7/4.7	280/280/90		
9	WTR	Delta 300	EOP-8	Vector Magnetometer Sat.	LCE	1 101	10.4/6.0	216/216/90	2 202	20.8
			EOP-8	Vector Magnetometer Sat.	LCE	1 101	10.4/6.0	216/216/90		
10	WTR	Delta 300	EOP-8	Vector Magnetometer Sat.	LCE	1 101	10.4/6.0	216/216/90	1 101	10.4
11	KSC	Delta 304	Phy-1B	Explorer - Medium Alt.	CE	641	10.5/5.0	20000/1000/28.5	641	10.5
12	KSC	THID7/C	PL-19	Mariner Jupiter Orbiter	LCE	5 804	35.6/14.7	-	5 804	35.6

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
13	KSC	TIID7/C	PL-19	Mariner Jupiter Orbiter	LCE	5 804	35.6/14.7	-	5 804	35.6
14	KSC	TIIB/C/BII	PL-10	Innerplanetary Follow-on	CE	1 857	9.0/9.0	-	1 857	9.0
15	KSC	TIIB/C/BII	PL-10	Innerplanetary Follow-on	CE	1 857	9.0/9.0	-	1 857	9.0
16	KSC	TIID7/C/BII	PL-18	Pioneer Saturn/Uranus flyby	CE	1 329	11.0/7.0	-	1 329	11.0
17	KSC	TIIC	Phy-3A	Environ Pert Sat. A	LCE	5 522	14.0/13.3	6900/6900/55	5 522	14.0
18	KSC	TIIC	AST-10(1)	Infrared Astr.	LCE	21 000	12.0/8.0	700/700/28.5	21 000	12.0
19	KSC	TIID	Phy-7-(1A)	MHD Experiment	LCE	20 000	12.0/8.0	200/200/28.5	20 000	12.0
20	WTR	TIIB/C	EO-3C	EOS- C	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0
21	KSC	TIIB/A	EOP-10(2)	EOPAP-Earth Dynamics	LCE	4 758	13.5/12.3	450/450/28.5	4 758	13.5
22	KSC	TIID/C	PL-26	Comet Encke Rend.	LCE	7 968	17.6/14.7	-	7 968	17.6
23	KSC	TIID/C	PL-26	Comet Encke Rend.	LCE	7 968	17.6/14.7	-	7 968	17.6
24	KSC	Delta 300	AST-1A	Explorer - LEO	CE	462	9.9/2.6	297/297/285	462	9.9
25	KSC	Delta 300	LS-1	Life Science Module	LCE	491	10.7/2.2	300/300/28.5	982	21.4
			LS-1	Life Science Module	LCE	491	10.7/2.2	300/300/28.5		
26	KSC	TIID7/BII	LOG MOD	Logistic Module	LCE	26 300	28.0/14.0	270/270/55	26 300	28.0
27	WTR	TIIB/C	NN/D-11	Earth Resources Sat - LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Year 1981 (Continued)										
Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
28	WTR	TIIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5
29	KSC	TIIIB/A	NN/D-16 C(2)	Com/Nav	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
30	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
31	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
32	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
33	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
34 <sub>D</sub>	WTR									
35 <sub>D</sub>	WTR									
36 <sub>D</sub>	WTR									
37 <sub>D</sub>	KSC									
38 <sub>D</sub>	KSC									
39 <sub>D</sub>	KSC									
40 <sub>D</sub>	KSC									
41 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Payload						Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
42 <sub>D</sub>	WTR									
43 <sub>D</sub>	WTR									
44 <sub>D</sub>	WTR									
45 <sub>D</sub>	WTR									
46 <sub>D</sub>	WTR									
47 <sub>D</sub>	WTR									
48 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
1	KSC	TIIID/C	NN/D-9	Foreign Geosyn. Met. Sat.	CE	596	8.0/6.0	Syn. Eq.	2 040	29.9
			NN/D-4	Traffic Management	CE	703	12.0/7.2	Syn. Eq.		
			NN/D-5	Foreign Comsat.	CE	741	9.9/5.8	Syn. Eq.		
2	KSC	TIIID/C	NN/D-2A	U.S. Dom Com Sat-A	LCE	1 057	11.1/7.6	Syn. Eq.	2 114	22.2
			NN/D-2A	U.S. Dom Com Sat-A	LCE	1 057	11.1/7.6	Syn. Eq.		
3	KSC	TIIID/C	NN/D-3	Disaster Warning Sat.	LCE	1 949	11.3/8.0	Syn. Eq.	3 026	22.2
			NN/D-10	Geosyn Oper Met Sat	LCE	1 077	10.9/7.2	Syn. Eq.		
4	WTR	Delta 300	NN/D-8	Environ. Mon. Sat.	CE	1 414	13.0/8.0	920/920/103	1 414	13.0
5	WTR	Delta 300	EO-5D	Special Purpose Sat. Polar	LCE	675	9.7/4.7	400/400/90	675	9.7
6	KSC	TIIID/BII	AST-6	LST	CE	20 639	36.3/12.0	340/340/28.5	20 639	36.3
7	WTR	Delta 900	EO-6	Tiros	LCE	1 920	12.3/10.0	790/790/102	1 920	12.3
8	WTR	TIIIC	EOP-4	Geopause	CE	2 231	10.0/6.5	16200/16200/90	2 231	10.0
9	KSC	TIIIC	NN/D-16B(1)	Astronomy	LCE	21 000	12.0/8.0	700/700/28.5	21 000	12.0
10	KSC	TIIIC	AST-10(2)	Infrared Astronomy	LCE	21 000	12.0/8.0	700/700/28.5	21 000	12.0
11	KSC	TIIIC	AST-11	Solar Physics - EOSO	LCE	19 000	12.0/8.0	550/550/28.5	19 000	12.0
12	KSC	TIIID7	Phy-6	Cosmic X-Ray Experiment	LCE	22 000	20.0/8.0	200/200/55	22 000	20.0
13	KSC	TIIID	AST-5	HEAO-D&E	CE	16 985	19.0/14.0	200/200/28.5	16 985	19.0
14	KSC	TIIID	ST-1	Long Duration Exposure Facility	CE	10 200	37.0/14.0	270/270/28.5	10 200	37.0

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Payload					Cargo	
				Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
15	WTR	Delta 904	EOP-3	SEASAT-B	LCE	3 030	18.3/14.7	325/325/90	3 030	18.3
16	WTR	TIIB/C	EO-3B	EOS-B	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0
17	WTR	TIIB/C	NN/D-16A(1)	Earth Obs.	LCE	6 635	45.0/10.0	500/500/98	6 635	45.0
18	WTR	TIIB/C	EOP-10(1)	EOPAP-Ocean Dynamics	LCE	4 758	13.5/12.3	450/450/90	4 758	13.5
19	KSC	TIIB/A	Phy-1C	Explorer - High Altitude	CE	720	9.0/4.0	-	720	9.0
20	KSC	TIIB/A	AST-3	Solar Physics Mission	LCE	4 281	13.1/11.6	270/270/30	4 281	13.1
21	KSC	TIIB/A	C/N-4	Comm/Nav.	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
22	KSC	Delta 300	AST-1A	Explorer - LEO	CE	462	9.9/2.6	297/297/28.5	462	9.9
23	KSC	Delta 300	LS-1 LS-1	Life Science Module Life Science Module	LCE LCE	491 491	10.7/2.2 10.7/2.2	300/300/28.5 300/300/28.5	982	21.4
24	KSC	TIID7/BII	LOG MOD	Logistic Module	LCE	26 300	28.0/14.0	270/270/55	26 300	28.0
25	WTR	TIIB/C	NN/D-11	Earth Resources Sat - LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1
26	WTR	TIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5
27	KSC	TIIB/A	NN/D-16 C(2)	Com/Nav	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
28	KSC	TIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
29	KSC	TIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Payload						Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
30	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
31	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
32 <sub>D</sub>	WTR									
33 <sub>D</sub>	WTR									
34 <sub>D</sub>	WTR									
35 <sub>D</sub>	KSC									
36 <sub>D</sub>	KSC									
37 <sub>D</sub>	KSC									
38 <sub>D</sub>	KSC									
39 <sub>D</sub>	KSC									
40 <sub>D</sub>	KSC									
41 <sub>D</sub>	KSC									
42 <sub>D</sub>	WTR									
43 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Payload						Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
44 <sub>D</sub>	WTR									
45 <sub>D</sub>	WTR									
46 <sub>D</sub>	WTR									
47 <sub>D</sub>	WTR									
48 <sub>D</sub>	WTR									
49 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
1	KSC	TIIID/C	NN/D-4	Traffic Management	CE	703	12.0/7.2	Syn. Eq.	4 691	21.8
			NN/D-1	INTEL SAT	CE	3 988	9.8/8.3	Syn. Eq.		
2	KSC	TIIID/C	NN/D-1	INTEL SAT	CE	3 988	9.8/8.3	Syn. Eq.	5 404	29.4
			NN/D-5	Foreign Comsat	CE	741	9.9/5.8	Syn. Eq.		
			EO-5E	Special Purpose Sat - Syn.	LCE	675	9.7/4.7	Syn. Eq.		
3	KSC	TIIID/C	NN/D-2A	U.S. Dom Com Sat-A	LCE	1 057	11.1/7.6	Syn. Eq.	6 225	24.9
			EO-4A	SEOS-R&D	LCE	5 168	13.8/12.9	Syn. Eq.		
4	KSC	TIIID/C	NN/D-10	Geosyn Oper Met Sat	LCE	1 077	10.9/7.2	Syn. Eq.	1 077	10.9
5	KSC	Delta 304	AST-1B	Explorer-Syn.	CE	462	9.9/2.6	19323/19323/28.5	462	9.9
6	KSC	TIIIB/C/BII	PL-10	Innerplanetary Follow-on	CE	1 857	9.0/9.0	-	1 857	9.0
7	WTR	Delta 900	Phy-2A	Gravity/Relativity Sat.-A	LCE	2 514	13.6/12.5	500/500/90	2 514	13.6
8	WTR	TIIIC	AST-10(1)	Infrared Astr.	LCE	21 000	12.0/8.0	700/700/90	21 000	12.0
9	KSC	TIIIC	NN/D-16D(1)	Solar Physics	LCE	19 000	12.0/8.0	550/550/28.5	19 000	12.0
10	KSC	TIIID	AST-9A	Focusing X-Ray Telescope-A	CE	16 985	19.0/14.0	270/270/28.5	16 985	19.0
11	KSC	TIIID	Phy-7(2B)	Particle Inject. Experiment	LCE	20 000	15.0/8.0	200/200/55	20 000	15.0
12	WTR	TIIIB/C	EO-3A	EOS-A	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0
13	KSC	TIIIB/A	Phy-1C	Explorer High Altitude	CE	720	9.0/4.0	-	720	9.0

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Payload					Cargo	
				Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi. /n. mi. /deg)	Weight (lb)	Length (ft)
14	KSC	TIIB/A	NN/D-2C	TDRS	CE	744	15.5/6.3	Syn. Eq.	744	15.5
15	KSC	TIIB/A	NN/D-2C	TDRS	CE	744	15.5/6.3	Syn. Eq.	744	15.5
16	KSC	TIIB/A	NN/D-2C	TDRS	CE	744	15.5/6.3	Syn. Eq.	744	15.5
17	KSC	TIIB/A	EOP-10(2)	EOPAP-Earth Dynamics	LCE	4 758	13.5/12.3	450/450/28.5	4 758	13.5
18	KSC	TIIB/A	NN/D-16B(6)	Astronomy	LCE	4 075	13.0/11.3	200/200/28.5	4 075	13.0
19	KSC	TIID/C	PL-11	Venus Radar Mapper	CE	8 972	28.5/15.0	-	8 972	28.5
20	KSC	TIID/C	PL-11	Venus Radar Mapper	CE	8 972	28.5/15.0	-	8 972	28.5
21	KSC	Delta 300	AST-1A	Explorer - LEO	CE	462	9.9/2.6	297/297/28.5	462	9.9
22	KSC	Delta 300	LS-1 LS-1	Life Science Module Life Science Module	LCE LCE	491 491	10.7/2.2 10.7/2.2	300/300/28.5 300/300/28.5	982	21.4
23	KSC	TIID7/BII	LOG MOD	Logistic Module	LCE	26 300	28.0/14.0	270/270/55	26 300	28.0
24	WTR	TIIB/C	NN/D-11	Earth Resources Sat - LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1
25	WTR	TIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5
26	WTR	TIIB/A	AST-10(6)	Explorer	LCE	4 075	13.0/11.3	200/200/90	4 075	13.0
27	KSC	TIIB/A	NN/D-16 C(2)	Com/Nav	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
28	KSC	TIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Payload					Cargo	
				Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
29	KSC	TIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
30	KSC	TIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
31	KSC	TIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
32 <sub>D</sub>	WTR									
33 <sub>D</sub>	WTR									
34 <sub>D</sub>	WTR									
35 <sub>D</sub>	WTR									
36 <sub>D</sub>	WTR									
37 <sub>D</sub>	WTR									
38 <sub>D</sub>	WTR									
39 <sub>D</sub>	KSC									
40 <sub>D</sub>	KSC									
41 <sub>D</sub>	KSC									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
42 <sub>D</sub>	KSC									
43 <sub>D</sub>	KSC									
44 <sub>D</sub>	KSC									
45 <sub>D</sub>	KSC									
46 <sub>D</sub>	KSC									
47 <sub>D</sub>	WTR									
48 <sub>D</sub>	WTR									
49 <sub>D</sub>	WTR									
50 <sub>D</sub>	WTR									
51 <sub>D</sub>	WTR									
52 <sub>D</sub>	WTR									
53 <sub>D</sub>	WTR									
54 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
1	KSC	THID/C	NN/D-9	Foreign Geosyn Met Sat	CE	596	8.0/6.0	Syn. Eq.	5 287	29.8
			NN/D-4	Traffic Management	CE	703	12.0/7.2	Syn. Eq.		
			NN/D-1	INTEL SAT	CE	3 988	9.8/8.3	Syn. Eq.		
2	KSC	THID/C	NN/D-1	INTEL SAT	CE	3 988	9.8/8.3	Syn. Eq.	4 729	19.7
			NN/D-5	Foreign Comsat	CE	741	9.9/5.8	Syn. Eq.		
3	KSC	THID/C	NN/D-1	INTEL SAT	CE	3 988	9.8/8.3	Syn. Eq.	3 988	19.7
4	KSC	THID/C	NN/D-2B	U.S. Dom Com Sat-B	CE	3 988	9.8/8.3	Syn. Eq.	3 988	19.7
5	WTR	Delta 300	Phy-1A	Explorer - Upper Atmosphere	CE	1 240	11.0/4.0	1900/140/90	1 240	11.0
6	WTR	Delta 300	EO-5C	Special Purpose Sat. Polar	LCE	675	9.7/4.7	280/280/90	675	9.7
7	KSC	Delta 304	Phy-1B	Explorer - Medium Altitude	CE	641	10.5/5.0	20000/1000/28.5	641	10.5
8	KSC	THID/BII	AST-6	LST	CE	20 639	36.3/12.0	340/340/28.5	20 639	36.3
9	KSC	THID7/C	PL-7	Mars Surface Sample Return	LCE	10 639	23.5/14.7	-	10 639	23.5
10	KSC	THID7/C	PL-7	Mars Surface Sample Return	LCE	10 639	23.5/14.7	-	10 639	23.5
11	KSC	THID7/C/BII	PL-20	Pioneer Jupiter Probe	LCE	1 963	11.8/8.8	-	1 963	11.8
12	KSC	THID7/C/BII	PL-20	Pioneer Jupiter Probe	LCE	1 963	11.8/8.8	-	1 963	11.8
13	KSC	THIC	Phy-3A	Environ. Pert. Sat-A	LCE	5 522	14.0/13.3	6900/6900/55	5 522	14.0
14	KSC	THIC	AST-10(3)	Ultraviolet Astr.	LCE	13 000	8.0/6.0	700/700/28.5	13 000	8.0

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
15	KSC	TIIIC	NN/D-16B(3)	Astronomy	LCE	13 000	8.0/6.0	700/700/28.5	13 000	8.0
16	KSC	TIIIC	AST-11	Solar Physics - EOSO	LCE	19 000	12.0/8.0	550/550/28.5	19 000	12.0
17	KSC	TIID7	Phy-6	Cosmic X-Ray Experiment	LCE	22 000	20.0/8.0	200/200/55	22 000	20.0
18	KSC	TIID	AST-5	HEAO-D&E	CE	16 985	19.0/14.0	200/200/28.5	16 985	19.0
19	KSC	TIID	ST-1	Long Duration Exposure Facility	CE	10 200	37.0/14.0	270/270/28.5	10 200	37.0
20	KSC	TIID	Phy-7(1B)	MHD Experiment	LCE	20 000	12.0/8.0	200/200/55	20 000	12.0
21	KSC	TIIB/C	LUN-2	Automated Lunar Orbiter	LCE	2 475	11.2/7.8	-	2 475	11.2
22	WTR	TIIB/C	EO-3C	EOS-C	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0
23	WTR	TIIB/C	NN/D-16A(1)	Earth Obs.	LCE	6 635	45.0/10.0	500/500/98	6 635	45.0
24	WTR	TIIB/C	EOP-10(1)	EOPAP-Ocean Dynamics	LCE	4 758	13.5/12.3	450/450/90	4 758	13.5
25	KSC	TIIB/A	AST-3	Solar Physics Mission	LCE	4 281	13.1/11.6	270/270/30	4 281	13.1
26	KSC	TIIB/A	AST-10(4)	UV Astr. Survey	LCE	4 075	13.0/11.3	700/700/28.5	4 075	13.0
27	KSC	TIIB/A	C/N-4	Comm/Nav.	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
28	KSC	Delta 300	AST-1A	Explorer - LEO	CE	462	9.9/2.6	297/297/285	462	9.9
29	KSC	Delta 300	LS-1 LS-1	Life Science Module Life Science Module	LCE	491	10.7/2.2	300/300/28.5 300/300/28.5	982	21.4

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

97  
TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Year 1984 (Continued)							
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Cargo	
30	KSC	TIIID7/BII	LOG MOD	Logistic Module	LCE	26 300	28.0/14.0	270/270/55	26 300	28.0
31	WTR	TIIIB/C	NN/D-11	Earth Resources Sat - LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1
32	WTR	TIIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5
33	KSC	TIIIB/A	AST-10(6)	Explorer	LCE	4 075	13.0/11.3	200/200/28.5	4 075	13.0
34	KSC	TIIIB/A	NN/D-16 C(2)	Com/Nav	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
35	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
36	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
37	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
38	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
39 <sub>D</sub>	WTR									
40 <sub>D</sub>	WTR									
41 <sub>D</sub>	KSC									
42 <sub>D</sub>	KSC									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Year 1984 (Continued)						Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
Payload										
Flight No.	Launch Site	Launch Vehicle	Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
43 <sup>D</sup>	KSC									
44 <sup>D</sup>	KSC									
45 <sup>D</sup>	KSC									
46 <sup>D</sup>	KSC									
47 <sup>D</sup>	KSC									
48 <sup>D</sup>	KSC									
49 <sup>D</sup>	KSC									
50 <sup>D</sup>	KSC									
51 <sup>D</sup>	KSC									
52 <sup>D</sup>	WTR									
53 <sup>D</sup>	WTR									
54 <sup>D</sup>	WTR									
55 <sup>D</sup>	WTR									
56 <sup>D</sup>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

48

Flight No.	Launch Site	Launch Vehicle	Payload					Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit IIA/HP/INC (n. mi./n. mi./deg)	Weight (lb)
57 <sub>D</sub>	WTR								
58 <sub>D</sub>	WTR								
59 <sub>D</sub>	WTR								

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
1	KSC	TIIID/C	NN/D-1	INTEL SAT	CE	3 988	9.8/8.3	Syn. Eq.	4 729	19.7
			NN/D-5	Foreign Comsat	CE	741	9.9/5.8	Syn. Eq.		
2	KSC	TIIID/C	NN/D-1	INTEL SAT	CE	3 988	9.8/8.3	Syn. Eq.	5 937	21.1
			NN/D-3	Disaster Warning Sat.	LCE	1 949	11.3/8.0	Syn. Eq.		
3	KSC	TIIID/C	NN/D-2B	U.S. Dom Com Sat-B	CE	3 988	9.8/8.3	Syn. Eq.	5 065	20.7
			NN/D-10	Geosyn Oper Met Sat	LCE	1 077	10.9/7.2	Syn. Eq.		
4	KSC	TIIID/C	NN/D-6	Communications R&D Sat.	LCE	3 871	13.1/11.6	Syn. Eq.	3 871	13.1
5	KSC	TIIID/C	EO-4A	SEOS-R&D	LCE	6 168	13.8/12.9	Syn. Eq.	5 168	13.8
6	WTR	Delta 300	NN/D-8	Environ. Mon. Sat.	CE	1 414	13.0/8.0	920/920/103	1 414	13.0
7	WTR	Delta 300	EO-5D	Special Sat-Polar	LCE	675	9.7/4.7	400/400/90	675	9.7
8	WTR	Scout	EOP-6C	Mini Lageos	CE	225	1.6/1.6	350/350/90	225	1.6
9	WTR	Scout	EOP-6C	Mini Lageos	CE	225	1.6/1.6	350/350/90	225	1.6
10	KSC	Scout	EOP-6A	Mini Lageos	CE	225	1.6/1.6	350/350/28.5	225	1.6
11	KSC	Scout	EOP-6A	Mini Lageos	CE	225	1.6/1.6	350/350/28.5	225	1.6
12	KSC	Scout	EOP-6B	Mini Lageos	CE	225	1.6/1.6	350/350/55	225	1.6
13	KSC	Scout	EOP-6B	Mini Lageos	CE	225	1.6/1.6	350/350/55	225	1.6
14	KSC	Delta 304	AST-1B	Explorer - Syn	CE	462	9.9/2.6	19323/19323/28.5	462	9.9

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

50

Flight No.	Launch Site	Launch Vehicle	Year 1985 (Continued)							
			Payload						Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)
			Code	Name	Type	Weight (lb)	L/D (ft/ft)			
15	KSC	TIIIB/C/BII	PL-27	Halley Flyby	LCE	2 073	13.5/12.2	-	2 073	13.5
16	KSC	TIIID7/C/BII	PL-12	Venus Buoyant Station	CE	13 798	14.0/15.0	-	13 798	14.0
17	KSC	TIIID7/C/BII	PL-12	Venus Buoyant Station	CE	13 798	14.0/15.0	-	13 798	14.0
18	KSC	TIIID7/C/BII	PL-21	Mariner Saturn Orbiter	CE	4 272	28.7/15.0	-	4 272	28.7
19	KSC	TIIID7/C/BII	PL-21	Mariner Saturn Orbiter	CE	4 272	28.7/15.0	-	4 272	28.7
20	KSC	TIIC	AST-8	LRO	CE	2 432	25.5/10.0	38646/38646/28.5	2 432	25.5
21	WTR	TIIC	AST-10(1)	Infrared Astr.	LCE	21 000	12.0/8.0	700/700/90	21 000	12.0
22	KSC	TIIC	NN/D-16B(2)	Astronomy	LCE	21 000	12.0/8.0	700/700/28.5	21 000	12.0
23	KSC	TIIID7	AST-9B	Focusing X-Ray Telescope-B	CE	23 535	54.5/14.0	270/270/28.5	23 535	54.5
24	WTR	TIIID7	Phy-7(3c)	Atmospheric Science	LCE	20 000	15.0/8.0	200/200/90	20 000	15.0
25	WTR	TIIID7	NN/D-16C(1)	Atmospheric and Space Physics	LCE	20 000	15.0/8.0	200/200/90	20 000	15.0
26	KSC	TIIID7	AST-7	LSO	CE	24 147	60.0/15.0	190/190/28.5	24 147	60.0
27	KSC	TIIID	Phy-7(2A)	Particle Inject Experiment	LCE	20 000	15.0/8.0	200/200/28.5	20 000	15.0
28	KSC	Delta 904	Phy-7(5)	Chemical Release	LCE	2 405	10.9/9.0	Suborbit/28.5	2 405	10.9
29	KSC	Delta 904	Phy-7(5)	Chemical Release	LCE	2 405	10.9/9.0	Suborbit/28.5	2 405	10.9
30	WTR	TIIIB/C	EO-3B	EOS-B	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
31	KSC	TIIIB/A	Phy-1C	Explorer-High Altitude	CE	720	9.0/4.0	-	720	9.0
32	KSC	TIIIB/A	EOP-10(2)	EOPAP-Earth Dynamics	LCE	4 758	13.5/12.3	450/450/28.5	4 758	13.5
33	KSC	Delta 300	AST-1A	Explorer-LEO	CE	462	9.9/2.6	297/297/28.5	462	9.9
34	KSC	Delta 300	LS-1 LS-1	Life Science Module Life Science Module	LCE LCE	491 491	10.7/2.2 10.7/2.2	300/300/28.5 300/300/28.5	982	21.4
35	KSC	TIIID7/BII	LOG MOD	Logistic Module	LCE	26 300	28.0/14.0	270/270/55	26 300	28.0
36	WTR	TIIIB/C	NN/D-11	Earth Resources Sat-LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1
37	WTR	TIIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5
38	WTR	TIIIB/A	AST-10(6)	Explorer	LCE	4 075	13.0/11.3	200/200/90	4 075	13.0
39	KSC	TIIIB/A	NN/D-16 C(2)	Com/Nav	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.0
40	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
41	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
42	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
43	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
44 <sub>D</sub>	WTR									
45 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

52

Flight No.	Launch Site	Launch Vehicle	Payload					Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)
46 <sub>D</sub>	WTR								
47 <sub>D</sub>	WTR								
48 <sub>D</sub>	WTR								
49 <sub>D</sub>	WTR								
50 <sub>D</sub>	WTR								
51 <sub>D</sub>	WTR								
52 <sub>D</sub>	KSC								
53 <sub>D</sub>	KSC								
54 <sub>D</sub>	KSC								
55 <sub>D</sub>	KSC								
56 <sub>D</sub>	KSC								
57 <sub>D</sub>	WTR								
58 <sub>D</sub>	WTR								
59 <sub>D</sub>	WTR								

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Payload						Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
60 <sub>D</sub>	WTR									
61 <sub>D</sub>	WTR									
62 <sub>D</sub>	WTR									
63 <sub>D</sub>	WTR									
64 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Type	Weight (lb)	L/D (ft/ft)	Payload		Cargo	
								Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)	
1	KSC	TIID/C	NN/D-9 NN/D-4 NN/D-1	Foreign Geosyn. Met. Sat. Traffic Management Intelsat	CE CE CE	596 703 3 988	8.0/6.0 12.0/7.2 9.8/8.3	Syn. Eq. Syn. Eq. Syn. Eq.	5 287	29.8	
2	KSC	TIID/C	NN/D-1 NN/D-5 EO-5E	Intelsat Foreign Com. Sat. Special Purpose Sat. Syn.	CE CE LCE	3 988 741 676	9.8/8.3 9.9/5.8 9.7/4.7	Syn. Eq. Syn. Eq. Syn. Eq.	5 404	29.4	
3	KSC	TIID/C	NN/D-2B	U.S. Dom. Com. Sat.-B	CE	3 988	9.8/8.3	Syn. Eq.	3 988	9.8	
4	KSC	TIID/C	NN/D-2B	U.S. Dom. Com. Sat.-B	CE	3 988	9.8/8.3	Syn. Eq.	3 988	9.8	
5	KSC	Delta 300	EOP-9	Magnetic Mon. Sat.	LCE	847	10.1/5.6	1 080/540/28	847	10.1	
6	WTR	Delta 300	NN/D-8	Environ. Mon. Sat.	CE	1 414	13.0/8.0	920/920/103	1 414	13.0	
7	WTR	Delta 300	EOP-8 EOP-8	Vector Magnetometer Sat. Vector Magnetometer Sat.	LCE LCE	1 101 1 101	10.4/6.0 10.4/6.0	216/216/90 216/216/90	2 202	20.8	
8	WTR	Delta 300	EOP-8	Vector Magnetometer Sat.	LCE	1 101	10.4/6.0	216/216/90	1 101	10.4	
9	KSC	TIID/BII	AST-6	LST	CE	20 639	36.3/12.0	340/340/28.5	20 639	36.3	
10	KSC	TIIB/C/BII	PL-10	Innerplanetary Follow-on	CE	1 857	9.0/9.0	-	1 857	9.0	
11	KSC	TIID7/C/BII	PL-22	Mariner Uranus Probe/Neptune Fly-by	CE	2 266	25.5/15.0	-	2 266	25.5	
12	KSC	TIID7/C/BII	PL-22	Mariner Uranus Probe/Neptune Fly-by	CE	2 266	25.5/15.0	-	2 266	25.5	

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
13	KSC	TIID7/BII	LS-2	Life Science Module	LCE	25 700	30.0/14.0	270/270/55	25 700	30.0
14	KSC	TIIC	AST-10(2)	Infrared Astr.	LCE	21 000	12.0/8.0	700/700/28.5	21 000	12.0
15	KSC	TIIC	AST-10(3)	Ultraviolet Astr.	LCE	13 000	8.0/6.0	700/700/28.5	13 000	8.0
16	KSC	TIIC	AST-11	Solar Physics-EOSO	LCE	19 000	12.0/8.0	550/550/28.5	19 000	12.0
17	KSC	TIID-7	ST-2	Advanced Technology Module	LCE	19 300	32.0/14.0	270/270/55	19 300	32.0
18	KSC	TIID-7	SP-1/NN/D-15	Space Processing Module	LCE	17 400	30.0/14.0	270/270/55	17 400	30.0
19	KSC	TIID-7	Phy-6	Cosmic X-Ray Experiment	LCE	22 000	20.0/8.0	200/200/55	22 000	20.0
20	KSC	TIID-7	NN/D-16D (2)	High Energy	LCE	22 000	20.0/8.0	200/200/56	22 000	20.0
21	KSC	TIID	AST-5	HEAO - D & E	CE	16 985	19.0/14.0	200/200/28.5	16 985	19.0
22	KSC	TIID	ST-1	Long Duration Exposure Facility	CE	10 200	37.0/14.0	270/270/28.5	10 200	37.0
23	KSC	TIIB/C	LUN-2	Automated Lunar Orbiter	LCE	2 475	11.2/7.8	-	2 475	11.2
24	WTR	TIIB/C	EO-3A	EOS-A	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0
25	WTR	TIIB/C	NN/D-16A (1)	Earth Obs.	LCE	6 635	45.0/10.0	500/500/98	6 635	45.0

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

56

Flight No.	Launch Site	Launch Vehicle	Year 1986 (Continued)							Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)	
26	WTR	TIIIB/C	EOP-10(1)	EOPAP - Ocean Dynamics	LCE	4 758	13.5/12.3	450/450/90	4 758	13.5	
27	WTR	TIIIB/A	NN/D-14	Global E & O Mon. System	LCE	4 908	13.6/12.5	200/200/98	4 908	13.6	
28	WTR	TIIIB/A	NN/D-14	Global E & O Mon. System	LCE	4 908	13.6/12.5	200/200/98	4 908	13.6	
29	WTR	TIIIB/A	NN/D-14	Global E & O Mon. System	LCE	4 908	13.6/12.5	200/200/98	4 908	13.6	
30	KSC	TIIIB/A	Phy-1C	Explorer - High Altitude	CE	720	9.0/4.0	-	720	9.0	
31	KSC	TIIIB/A	AST-3	Solar Physics Mission	LCE	4 281	13.1/11.6	270/270/30	4 281	13.1	
32	KSC	TIIIB/A	NN/D-16B (6)	Astronomy	LCE	4 075	13.0/11.3	200/200/28.5	4 075	13.0	
33	KSC	TIIIB/A	C/N-4	Comm/Nav.	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5	
34	KSC	TIIID/C	Phy-2B	Gravity/Relativity Sat.-B	LCE	1 372	12.0/9.0	-	1 372	12.0	
35	KSC	TIIID/C	PL-28	Asteroid Rend.	LCE	18 754	19.3/14.7	-	18 754	19.3	
36	KSC	TIIID/C	PL-28	Asteroid Rend.	LCE	18 754	19.3/14.7	-	18 754	19.3	
37	KSC	Delta 300	AST-1A	Explorer - LEO	CE	462	9.9/2.6	297/297/28.5	462	9.9	
38	KSC	Delta 300	LS-1 LS-1	Life Science Module Life Science Module	LCE	491	10.7/2.2	300/300/28.5	982	21.4	
					LCE	491	10.7/2.2	300/300/28.5			

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Year 1986 (Continued)							Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)	
39	KSC	TIIID-7/BII	LOG-MOD	Logistic Module	LCE	26 300	28.0/14.0	270/270/55	26 300	28.0	
40	WTR	TIIIB/C	NN/D-11	Earth Resources Sat.-LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1	
41	WTR	TIIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5	
42	KSC	TIIIB/A	Ast-10(6)	Explorer	LCE	4 075	13.0/11.3	200/200/28.5	4 075	13.0	
43	KSC	TIIIB/A	NN/D-16 C(2)	Com/Nav.	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5	
44	KSC	TIIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8	
45	KSC	TIIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8	
46	KSC	TIIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8	
47	KSC	TIIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8	
48 <sub>D</sub>	WTR										
49 <sub>D</sub>	WTR										

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

58

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
50 <sub>D</sub>	WTR									
51 <sub>D</sub>	KSC									
52 <sub>D</sub>	KSC									
53 <sub>D</sub>	KSC									
54 <sub>D</sub>	KSC									
55 <sub>D</sub>	KSC									
56 <sub>D</sub>	KSC									
57 <sub>D</sub>	WTR									
58 <sub>D</sub>	WTR									
59 <sub>D</sub>	WTR									
60 <sub>D</sub>	WTR									
61 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Payload					Cargo	
				Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi. / n. mi. / deg)	Weight (lb)	Length (ft)
62 <sub>D</sub>	WTR									
63 <sub>D</sub>	WTR									
64 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

6

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HIP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
1	KSC	TIID/C	NN/D-2B	U.S. Dom. Com. Sat.-B	CE	3 988	9.8/8.3	Syn. Eq.	4 729	19.7
			NN/D-5	Foreign Comsat.	CE	741	9.9/5.8	Syn. Eq.		
2	KSC	TIID/C	NN/D-2B	U.S. Dom. Com. Sat.-B	CE	3 988	9.8/8.3	Syn. Eq.	5 065	20.7
			EO-7	Syn. Met. Sat.	LCE	1 077	10.9/7.2	Syn. Eq.		
3	KSC	TIID/C	EO-4B	SEOS Oper.	LCE	5 168	13.8/12.9	Syn. Eq.	6 245	24.7
			NN/D-10	Geosyn. Oper. Met. Sat.	LCE	1 077	10.9/7.2	Syn. Eq.		
4	KSC	TIID/C	EO-4B	SEOS Oper.	LCE	5 168	13.8/12.9	Syn. Eq.	5 168	13.8
5	WTR	Delta 300	NN/D-8	Environ. Mon. Sat.	CE	1 414	13.0/8.0	920/920/103	1 414	13.0
6	WTR	Delta 300	EO-5C	Special Purpose Sat. Polar	LCE	675	9.7/4.7	280/280/90	675	9.7
7	KSC	Delta 304	Ast-1B	Explorer - Syn.	CE	462	9.9/2.6	19323/19323/28.5	462	9.9
8	KSC	TIID-7/C	Phy-5	Cosmic Ray Lab.	CE	46 757	45.0/14.0	200/200/28.5	46 757	45.0
9	WTR	Delta 900	EO-6	Tiros	LCE	1 920	12.3/10.0	790/790/102	1 920	12.3
10	KSC	TIIC	Ast-8	LRO	CE	2 432	25.5/10.0	38646/38646/28.5	2 432	25.5
11	WTR	TIIC	Ast-10(1)	Infrared Astr.	LCE	21 000	12.0/8.0	700/700/90	21 000	12.0
12	WTR	TIID-7	Phy-7(4)	Auroral Observatory	LCE	20 000	15.0/8.0	200/200/90	20 000	15.0

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
13	WTR	TIID-7	Phy-7(2C)	Particle Inject.	LCE	20 000	15.0/8.0	200/200/90	20 000	15.0
14	KSC	TIID-7	Ast-7	LSO	CE	24 147	60.0/15.0	190/190/28.5	24 147	60.0
15	KSC	TIID	Ast-9A	Focusing X-Ray Telescope-A	CE	16 985	19.0/14.0	270/270/28.5	16 985	19.0
16	KSC	Delta 904	Phy-7(5)	Chemical Release	LCE	2 405	10.9/9.0	Sub-orbital/28.5	2 405	10.9
17	KSC	Delta 904	Phy-7(5)	Chemical Release	LCE	2 405	10.9/9.0	Sub-orbital/28.5	2 405	10.9
18	WTR	TIIB/C	EO-3C	EOS-C	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0
19	KSC	TIIB/A	Phy-1C	Explorer - High Altitude	CE	720	9.0/4.0	-	720	9.0
20	KSC	TIIB/A	EOP-10(2)	EOPAP - Earth Dynamics	LCE	4 758	13.5/12.3	405/450/28.5	4 758	13.5
21	KSC	TIIB/A	Ast-10(5)	X-Ray & UV Astr.	LCE	4 075	13.0/11.3	700/700/28.5	4 075	13.0
22	KSC	TIIB/A	NN/D-16B (4)	Astronomy	LCE	4 075	13.0/11.3	700/700/28.5	4 075	13.0
23	KSC	TIID/C	Phy-3B	Environ. Pert. Sat.-B	CE	8 874	15.5/10.0	6900/6900/55	8 874	15.5
24	KSC	TIID/C	PL-13	Mercury Orbiter	CE	8 420	28.7/15.0	-	8 420	28.7
25	KSC	TIID/C	PL-13	Mercury Orbiter	CE	8 420	28.7/15.0	-	8 420	28.7
26	KSC	TIID/C	LUN-3	Automated Lunar Rover	CE	8 700	24.0/10.0	-	8 700	24.0
27	KSC	Delta 300	Ast-1A	Explorer - LEO	CE	462	9.9/2.6	297/297/28.5	462	9.9

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

82

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
28	KSC	Delta 300	LS-1 LS-1	Life Science Module Life Science Module	LCE LCE	491 491	10.7/2.2 10.7/2.2	300/300/28.5 300/300/28.5	982	21.4
29	KSC	TIID-7/BII	LOG-MOD	Logistic Module	LCE	26 300	28.0/14.0	270/270/55	26 300	28.0
30	WTR	TIIB/C	NN/D-11	Earth Resources Sat. - LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1
31	WTR	TIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5
32	WTR	TIIB/A	AST-10(6)	Explorer	LCE	4 075	13.0/11.3	200/200/90	4 075	13.0
33	KSC	TIIB/A	NN/D-16 C(2)	Com/Nav	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
34	KSC	TIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
35	KSC	TIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
36	KSC	TIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
37	KSC	TIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
38 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Payload						Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi. /n. mi. /deg)	Weight (lb)	Length (ft)
39 <sub>D</sub>	WTR									
40 <sub>D</sub>	WTR									
41 <sub>D</sub>	WTR									
42 <sub>D</sub>	KSC									
43 <sub>D</sub>	KSC									
44 <sub>D</sub>	KSC									
45 <sub>D</sub>	KSC									
46 <sub>D</sub>	KSC									
47 <sub>D</sub>	KSC									
48 <sub>D</sub>	KSC									
49 <sub>D</sub>	KSC									
50 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Payload					Cargo	
				Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi. /n. mi. /deg)	Weight (lb)	Length (ft)
51 <sub>D</sub>	WTR									
52 <sub>D</sub>	WTR									
53 <sub>D</sub>	WTR									
54 <sub>D</sub>	WTR									
55 <sub>D</sub>	WTR									
56 <sub>D</sub>	WTR									
57 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
1	KSC	TIIID/C	NN/D-9	Foreign Geosyn Met. Sat.	CE	596	8.0/6.0	Syn. Eq.	3 967	28.7
			NN/D-4	Traffic Management	CE	703	12.0/7.2	Syn. Eq.		
			NN/D-13	Foreign SEOS	CE	2 668	8.7/7.4	Syn. Eq.		
2	KSC	TIIID/C	NN/D-12	Earth Resources - Syn.	CE	2 668	8.7/7.4	Syn. Eq.	6 077	27.3
			NN/D-12	Earth Resources - Syn.	CE	2 668	8.7/7.4	Syn. Eq.		
			NN/D-5	Foreign Comsat.	CE	741	9.9/5.8	Syn. Eq.		
3	KSC	TIIID/C	NN/D-2B	U.S. Dom. Com. Sat.-B	CE	3 988	9.8/8.3	Syn. Eq.	5 065	20.7
			NN/D-10	Geosyn. Oper. Met. Sat.	LCE	1 077	10.9/7.2	Syn. Eq.		
4	KSC	TIIID/C	NN/D-2B	U.S. Dom. Com. Sat.-B	CE	3 988	9.8/8.3	Syn. Eq.	3 988	9.8
5	KSC	TIIID/C	NN/D-2B	U.S. Dom. Com. Sat.-B	CE	3 988	9.8/8.3	Syn. Eq.	3 988	9.8
6	KSC	TIIID/C	NN/D-6	Communications R & D Sat.	LCE	3 871	13.1/11.6	Syn. Eq.	3 871	13.1
7	WTR	Delta 300	NN/D-8	Environ. Mon. Sat.	CE	1 414	13.0/8.0	920/920/103	1 414	13.0
8	WTR	Delta 300	EO-5D	Special Purpose Sat. Polar	LCE	675	9.7/4.7	400/400/90	675	9.7
9	WTR	Delta 300	Phy-1A	Explorer - Upper Atmosphere	CE	1 240	11.0/4.0	1900/140/90	1 240	11.0
10	KSC	Delta 304	Phy-1B	Explorer - Medium Alt.	CE	641	10.5/5.0	20000/1000/28.5	641	10.5
11	KSC	TIIID/BII	Ast-6	LST	CE	20 639	36.3/12.0	340/340/28.5	20 639	36.3
12	KSC	TIIID-7/C/BII	Phy-4	Heliocentric & Interstellar S/C	LCE	931	12.9/11.1	-	931	12.9

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

99

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HIP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
13	KSC	TIIIC	NN/D-16B (1)	Astronomy	LCE	21 000	12.0/8.0	700/700/28.5	21 000	12.0
14	KSC	TIIIC	Ast-10(3)	Ultraviolet Astr.	LCE	13 000	8.0/6.0	700/700/28.5	13 000	8.0
15	KSC	TIIIC	Ast-11	Solar Physics - EOSO	LCE	19 000	12.0/8.0	550/550/28.5	19 000	12.0
16	WTR	TIID-7	Phy-7(1C)	MHD Experiment	LCE	20 000	12.0/8.0	200/200/90	20 000	12.0
17	KSC	TIID	Ast-5	HEAO - D & E	CE	16 985	19.0/14.0	200/200/28.5	16 985	19.0
18	KSC	TIID	ST-1	Long Duration Exposure Module	CE	10 200	37.0/14.0	270/270/28.5	10 200	37.0
19	WTR	TIIB/C	EO-3B	EOS - B	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0
20	WTR	TIIB/C	NN/D-16A (1)	Earth Obs.	LCE	6 635	45.0/10.0	500/500/98	6 635	45.0
21	WTR	TIIB/C	EOP-10(1)	EOPAP - Ocean Dynamics	LCE	4 758	13.5/12.3	450/450/90	4 758	13.5
22	WTR	TIIB/A	NN/D-14	Global E & O Mon. System	LCE	4 908	13.6/12.5	200/200/98	4 908	13.6
23	WTR	TIIB/A	NN/D-14	Global E & O Mon. System	LCE	4 908	13.6/12.5	200/200/98	4 908	13.6
24	WTR	TIIB/A	NN/D-14	Global E & O Mon. System	LCE	4 908	13.6/12.5	200/200/98	4 908	13.6
25	KSC	TIIB/A	Ast-3	Solar Physics Mission	LCE	4 281	13.1/11.6	270/270/30	4 281	13.1
26	KSC	TIIB/A	NN/D-2C	TDRS	CE	744	15.5/6.3	Syn. Eq.	744	15.5

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
27	KSC	TIIIB/A	NN/D-2C	TDRS	CE	744	15.5/6.3	Syn. Eq.	744	15.5
28	KSC	TIIIB/A	NN/D-2C	TDRS	CE	744	15.5/6.3	Syn. Eq.	744	15.5
29	KSC	TIIIB/A	C/N-4	Comm./Nav.	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
30	KSC	TIID/C	LUN-3	Automated Lunar Rover	CE	8 700	24.0/10.0	-	8 700	24.0
31	KSC	Delta 300	Ast-1A	Explorer - LEO	CE	462	9.9/2.6	297/297/28.5	462	9.9
32	KSC	Delta 300	LS-1 LS-1	Life Science Module Life Science Module	LCE	491	10.7/2.2	300/300/28.5	982	21.4
33	KSC	TIID-7/BII	LOG-MOD	Logistic Module	LCE	26 300	28.0/14.0	270/270/55	26 300	28.0
34	WTR	TIIIB/C	NN/D-11	Earth Resources Sat. - LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1
35	WTR	TIIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5
36	KSC	TIIIB/A	Ast-10(6)	Explorer	LCE	4 075	13.0/11.3	200/200/28.5	4 075	13.0
37	KSC	TIIIB/A	NN/D-16 C(2)	Com./Nav.	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
38	KSC	TIIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
39	KSC	TIIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
40	KSC	THIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
41	KSC	THIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
42 <sub>D</sub>	WTR									
43 <sub>D</sub>	WTR									
44 <sub>D</sub>	WTR									
45 <sub>D</sub>	KSC									
46 <sub>D</sub>	KSC									
47 <sub>D</sub>	KSC									
48 <sub>D</sub>	KSC									
49 <sub>D</sub>	KSC									
50 <sub>D</sub>	KSC									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
51 <sub>D</sub>	KSC									
52 <sub>D</sub>	KSC									
53 <sub>D</sub>	WTR									
54 <sub>D</sub>	WTR									
55 <sub>D</sub>	WTR									
56 <sub>D</sub>	WTR									
57 <sub>D</sub>	WTR									
58 <sub>D</sub>	WTR									
59 <sub>D</sub>	WTR									
60 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

70

Flight No.	Launch Site	Launch Vehicle	Code	Payload					Cargo	
				Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
1	KSC	THID/C	NN/D-1	Intelsat	CE	3 988	9.8/8.3	Syn. Eq.	7 397	28.4
			NN/D-13	Foreign SEOS	CE	2 668	8.7/7.4	Syn. Eq.		
			NN/D-5	Foreign Comsat	CE	741	9.9/5.8	Syn. Eq.		
2	KSC	THID/C	NN/D-1	Intelsat	CE	3 988	9.8/8.3	Syn. Eq.	7 331	28.2
			NN/D-13	Foreign SEOS	CE	2 668	8.7/7.4	Syn. Eq.		
			EO-5E	Special Purpose Sat.	LCE	675	9.7/4.7	Syn. Eq.		
3	KSC	THID/C	NN/D-2B	U.S. Dom. Com. Sat.-B	CE	3 988	9.8/8.3	Syn. Eq.	5 065	20.7
			NN/D-10	Geosyn. Oper Met. Sat.	LCE	1 077	10.9/7.2	Syn. Eq.		
4	KSC	THID/C	NN/D-2B	U.S. Dom. Com. Sat-B	CE	3 988	9.8/8.3	Syn. Eq.	3 988	9.8
5	KSC	THID/C	EO-4B	SEOS-Oper.	LCE	5 168	13.8/12.9	Syn. Eq.	5 168	13.8
6	KSC	THID/C	EO-4B	SEOS-Oper.	LCE	5 168	13.8/12.9	Syn. Eq.	5 168	13.8
7	WTR	Delta 300	Phy-1A	Explorer-Upper Atmosphere	CE	1 240	11.0/4.0	1900/140/90	1 240	11.0
8	KSC	Delta 304	Phy-1B	Explorer-Medium Altitude	CE	641	10.5/5.0	20000/1000/28.5	641	10.5
9	KSC	THID7/C	Phy-5	Cosmic Ray Lab	CE	46 757	45.0/14.0	200/200/28.5	46 757	45.0
10	KSC	THIC	AST-8	LRO	CE	2 432	25.5/10.0	38646/38646/28.5	2 432	25.5
11	KSC	THIC	LUN-4	Halo Sat.	LCE	4 633	19.1/14.7	-	4 633	19.1
12	WTR	THIC	AST-10(1)	Infrared Astr.	LCE	21 000	12.0/8.0	700/700/90	21 000	12.0
13	KSC	THID7	AST-9B	Focusing X-Ray Telescope-B	CE	23 535	54.5/14.0	270/270/28.5	23 535	54.5

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
14	KSC	TIID7	Phy-6	Cosmic X-Ray Experiment	LCE	22 000	20.0/8.0	200/200/55	22 000	20.0
15	KSC	TIID7	AST-7	LSO	CE	24 147	60.0/15.0	190/190/28.5	24 147	60.0
16	WTR	TIIB/C	EO-3A	EOS-A	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0
17	KSC	TIIB/A	EOP-10(2)	EOPAP-Earth Dynamics	LCE	4 758	13.5/12.3	450/450/28.5	4 758	13.5
18	KSC	TIIB/A	NN/D-16B(6)	Astronomy	LCE	4 075	13.0/11.3	200/200/28.5	4 075	13.0
19	KSC	TIIB/A	AST-10(5)	X-Ray and UV Astr.	LCE	4 075	13.0/11.3	700/700/28.5	4 075	13.0
20	KSC	TIID/C	PL-14	Venus Large Lander	LCE	6 128	27.8/14.7	-	6 128	27.8
21	KSC	TIID/C	PL-14	Venus Large Lander	LCE	6 128	27.8/14.7	-	6 128	27.8
22	KSC	Delta 300	AST-1A	Explorer - LEO	CE	462	9.9/2.6	297/297/28.5	462	9.9
23	KSC	Delta 300	LS-1 LS-1	Life Science Module Life Science Module	LCE LCE	491 491	10.7/2.2 10.7/2.2	300/300/28.5 300/300/28.5	982	21.4
24	KSC	TIID7/BII	LOG MOD	Logistic Module	LCE	26 300	28.0/14.0	270/270/55	26 300	28.0
25	WTR	TIIB/C	NN/D-11	Earth Resources Sat - LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1
26	WTR	TIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5
27	WTR	TIIB/A	AST-10(6)	Explorer	LCE	4 075	13.0/11.3	200/200/90	4 075	13.0
28	KSC	TIIB/A	NN/D-16 C(2)	Com/Nav	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

72

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
29	KSC	TIHM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
30	KSC	TIHM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
31	KSC	TIHM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
32	KSC	TIHM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
33 <sub>D</sub>	WTR									
34 <sub>D</sub>	WTR									
35 <sub>D</sub>	WTR									
36 <sub>D</sub>	WTR									
37 <sub>D</sub>	WTR									
38 <sub>D</sub>	WTR									
39 <sub>D</sub>	KSC									
40 <sub>D</sub>	KSC									
41 <sub>D</sub>	KSC									
42 <sub>D</sub>	KSC									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
43 <sub>D</sub>	KSC									
44 <sub>D</sub>	WTR									
45 <sub>D</sub>	WTR									
46 <sub>D</sub>	WTR									
47 <sub>D</sub>	WTR									
48 <sub>D</sub>	WTR									
49 <sub>D</sub>	WTR									
50 <sub>D</sub>	WTR									
51 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

74

Flight No.	Launch Site	Launch Vehicle	Code	Payload					Cargo	
				Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
1	KSC	TIIID/C	NN/D-9	Foreign Geosyn. Met. Sat.	CE	596	8.0/6.0	Syn. Eq.	5 287	29.8
			NN/D-4	Traffic Management	CE	703	12.0/7.2	Syn. Eq.		
			NN/D-1	Intelsat	CE	3 988	9.8/8.3	Syn. Eq.		
2	KSC	TIIID/C	NN/D-1	Intelsat	CE	3 988	9.8/8.3	Syn. Eq.	7 397	28.4
			NN/D-12	Earth Resources-Syn.	CE	2 668	8.7/7.4	Syn. Eq.		
			NN/D-5	Foreign Comsat.	CE	741	9.9/5.8	Syn. Eq.		
3	KSC	TIIID/C	NN/D-1	Intelsat	CE	3 988	9.8/8.3	Syn. Eq.	6 656	18.5
			NN/D-12	Earth Resources-Syn	CE	2 668	8.7/7.4	Syn. Eq.		
4	KSC	TIIID/C	NN/D-2B	U.S. Dom. Com. Sat.-B	CE	3 988	9.8/8.3	Syn. Eq.	5 937	21.1
			NN/D-3	Disaster Warning Sat.	LCE	1 949	11.3/8.0	Syn. Eq.		
5	KSC	TIIID/C	NN/D-2B	U.S. Dom. Com. Sat-B	CE	3 988	9.8/8.3	Syn. Eq.	3 988	9.8
6	KSC	TIIID/C	NN/D-6	Communications R&D Sat.	LCE	3 871	13.1/11.6	Syn. Eq.	3 871	13.1
7	KSC	Delta 300	EOP-9	Magnetic Mon. Sat.	LCE	847	10.1/5.6	1080/540/28.0	847	10.1
8	WTR	Delta 300	Phy-1A	Explorer-Upper Atmosphere	CE	1 240	11.0/4.0	1900/140/90	1 240	11.0
9	WTR	Delta 300	NN/D-8	Environ. Mon. Sat.	CE	1 414	13.0/8.0	920/920/103	1 414	13.0
10	WTR	Delta 300	EO-5C	Special Purpose Sat. Polar	LCE	675	9.7/4.7	280/280/90	675	9.7
11	WTR	Delta 300	EOP-8	Vector Magnetometer Sat.	LCE	1 101	10.4/6.0	216/216/90	2 202	20.8
			EOP-8	Vector Magnetometer Sat.	LCE	1 101	10.4/6.0	216/216/90		
12	WTR	Delta 300	EOP-8	Vector Magnetometer Sat.	LCE	1 101	10.4/6.0	216/216/90	1 101	10.4

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Payload					Cargo	
				Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
13	KSC	Delta 304	Phy-1B	Explorer-Medium Altitude	CE	641	10.5/6.0	20000/1000/28.5	641	10.5
14	KSC	TIID/BII	AST-6	LST	CE	20 639	36.3/12.0	340/340/28.5	20 639	36.3
15	KSC	TIID7/C/BII	PL-23	Jupiter Sat. Orbiter/Lander	CE	21 909	29.5/15.0	-	21 909	29.5
16	KSC	TIIC	AST-10(2)	Infrared Astr.	LCE	21 000	12.0/8.0	700/700/28.5	21 000	12.0
17	KSC	TIIC	AST-10(3)	Ultraviolet Astr.	LCE	13 000	8.0/6.0	700/700/28.5	13 000	8.0
18	KSC	TIIC	AST-11	Solar Physics EOSO	LCE	19 000	12.0/8.0	550/550/28.5	19 000	12.0
19	WTR	TIID7	Phy-7(4)	Auroral Observatory	LCE	20 000	15.0/8.0	200/200/90	20 000	15.0
20	KSC	TIID	AST-5	HEAO-D&E	CE	16 985	19.0/14.0	200/200/28.5	16 985	19.0
21	KSC	TIID	ST-1	Long Duration Exposure Facility	CE	10 200	37.0/14.0	270/270/28.5	10 200	37.0
22	KSC	TIID	Phy-7(2A)	Particle Inject.	LCE	20 000	15.0/8.0	200/200/28.5	20 000	15.0
23	KSC	TIID	Phy-7(3A)	Atmospheric Science	LCE	20 000	15.0/8.0	200/200/28.5	20 000	15.0
24	KSC	Delta 904	Phy-7(5)	Chemical Release	LCE	2 405	10.9/9.0	Sub-orbital/28.5	2 405	10.9
25	KSC	Delta 904	Phy-7(5)	Chemical Release	LCE	2 405	10.9/9.0	Sub-orbital/28.5	2 405	10.9
26	WTR	TIIB/C	EO-3C	EOS-C	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0
27	WTR	TIIB/C	NN/D-16A(1)	Earth Obs.	LCE	6 635	45.0/10.0	500/500/98	6 635	45.0
28	WTR	TIIB/C	EOP-10(1)	EOPAP-Ocean Dynamics	LCE	4 758	13.5/12.3	450/450/90	4 758	13.5

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

76

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
29	WTR	TIIIB/A	NN/D-14	Global E. & O. Mon. System	LCE	4 908	13.6/12.5	200/200/98	4 908	13.6
30	WTR	TIIIB/A	NN/D-14	Global E. & O. Mon. System	LCE	4 908	13.6/12.5	200/200/98	4 908	13.6
31	WTR	TIIIB/A	NN/D-14	Global E. & O. Mon. System	LCE	4 908	13.6/12.5	200/200/98	4 908	13.6
32	KSC	TIIIB/A	AST-3	Solar Physics Mission	LCE	4 281	13.1/11.6	270/270/30	4 281	13.1
33	KSC	TIIIB/A	NN/D-16B(5)	Astronomy	LCE	4 075	13.0/11.3	700/700/28.5	4 075	13.0
34	KSC	TIIIB/A	C/N-4	Comm/Nav.	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
35	KSC	TIIID/C	Phy-3B	Environ. Pert. Sat.-B	CE	8 874	15.5/10.0	6900/6900/55	8 874	15.5
36	KSC	TIIID/C	PL-8	MSSR	CE	8 913	28.7/15.0	-	8 913	28.7
37	KSC	TIIID/C	LUN-5	Lunar Sample Return	CE	11 500	24.0/10.0	-	11 500	24.0
38	KSC	Delta 300	AST-1A	Explorer-LEO	CE	462	9.9/2.6	297/297/28.5	462	9.9
39	KSC	Delta 300	LS-1 LS-1	Life Science Module Life Science Module	LCE LCE	491 491	10.7/2.2 10.7/2.2	300/300/28.5 300/300/28.5	982	21.4
40	KSC	TIIID7/BII	LOG MOD	Logistic Module	LCE	26 300	28.0/14.0	270/270/55	26 300	28.0
41	WTR	TIIIB/C	NN/D-11	Earth Resources Sat-LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1
42	WTR	TIIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5
43	KSC	TIIIB/A	AST-10(6)	Explorer	LCE	4 075	13.0/11.3	200/200/28.5	4 075	13.0

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
44	KSC	TIIIB/A	NN/D-16 C(2)	Com/Nav	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5
45	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
46	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
47	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
48	KSC	TIIIM	BIG G/CPM	BIG G/CPM-Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8
49 <sub>D</sub>	WTR									
50 <sub>D</sub>	KSC									
51 <sub>D</sub>	KSC									
52 <sub>D</sub>	KSC									
53 <sub>D</sub>	KSC									
54 <sub>D</sub>	KSC									
55 <sub>D</sub>	KSC									
56 <sub>D</sub>	KSC									
57 <sub>D</sub>	KSC									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Year 1990 (Concluded)							Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)	
58 <sub>D</sub>	KSC										
59 <sub>D</sub>	KSC										
60 <sub>D</sub>	WTR										
61 <sub>D</sub>	WTR										
62 <sub>D</sub>	WTR										
63 <sub>D</sub>	WTR										
64 <sub>D</sub>	WTR										
65 <sub>D</sub>	WTR										
66 <sub>D</sub>	WTR										
67 <sub>D</sub>	WTR										

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n.mi./n.mi./deg)	Weight (lb)	Length (ft)
1	KSC	TIIID/C	NN/D-1	Intelsat	CE	3 988	9.8/8.3	Syn. Eq.	7 397	28.4
			NN/D-13	Foreign SEOS	CE	2 668	8.7/7.4	Syn. Eq.		
			NN/D-5	Foreign Comsat.	CE	741	9.9/5.8	Syn. Eq.		
2	KSC	TIIID/C	NN/D-1	Intelsat	CE	3 988	9.8/8.3	Syn. Eq.	5 065	20.7
			NN/D-10	Geosyn. Oper. Met. Sat.	LCE	1 077	10.9/7.2	Syn. Eq.		
3	KSC	TIIID/C	NN/D-2B	U.S. Dom. Com. Sat. - B	CE	3 988	9.8/8.3	Syn. Eq.	3 988	9.8
4	KSC	TIIID/C	EO-4B	SEOS - Oper.	LCE	5 168	13.8/12.9	Syn. Eq.	5 168	13.8
5	KSC	TIIID/C	EO-4B	SEOS - Oper.	LCE	5 168	13.8/12.9	Syn. Eq.	5 168	13.8
6	WTR	Delta 300	Phy-1A	Explorer - Upper Atmosphere	CE	1 240	11.0/4.0	1900/140/90	1 240	11.0
7	WTR	Delta 300	NN/D-8	Environ. Mon. Sat.	CE	1 414	13.0/8.0	920/920/103	1 414	13.0
8	WTR	Delta 300	EO-5D	Special Purpose Sat. Polar	LCE	675	9.7/4.7	400/400/90	675	9.7
9	KSC	Delta 304	Phy-1B	Explorer - Medium Altitude	CE	641	10.5/5.0	20000/1000/28.5	641	10.5
10	KSC	TIIID-7/C	Phy-5	Cosmic Ray Lab.	CE	46 757	45.0/14.0	200/200/28.5	46 757	45.0
11	KSC	TIIID-7/C/BII	PL-23	Jupiter Sat. Orbiter/Lander	CE	21 909	29.5/15.0	-	21 909	29.5
12	KSC	TIIIC	Ast-8	LRO	CE	2 432	25.5/10.0	38646/38646/28.5	2 432	25.5
13	WTR	TIIIC	Ast-10(1)	Infrared Astr.	LCE	21 000	12.0/8.0	700/700/90	21 000	12.0

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

88

Flight No.	Launch Site	Launch Vehicle	Code	Name	Type	Payload			Cargo	
						Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
14	KSC	TIID-7	Ast-7	LSO	CE	24 147	60.0/15.0	190/190/28.5	24 147	60.0
15	KSC	TIID	Ast-9A	Focusing X-Ray Telescope-A	CE	16 985	19.0/14.0	270/270/28.5	16 985	19.0
16	WTR	TIIB/C	EO-3B	EOS - B	LCE	6 630	36.0/10.2	494/494/99	6 630	36.0
17	KSC	TIIB/A	EOP-10(2)	EOPAP - Earth Dynamics	LCE	4 758	13.5/12.3	450/450/28.5	4 758	13.5
18	KSC	TIIB/A	Ast-10(4)	UV Astr. Survey	LCE	4 075	13.0/11.3	200/200/28.5	4 075	13.0
19	KSC	TIIB/A	Ast-10(5)	X-Ray & UV Astr.	LCE	4 075	13.0/11.3	700/700/28.5	4 075	13.0
20	KSC	TIID/C	Phy-2B	Gravity/Relativity Sat.-B	LCE	1 372	12.0/9.3	—	1 372	12.0
21	KSC	TIID/C	PL-8	MSSR	CE	8 913	28.7/15.0	—	8 913	28.7
22	KSC	TIID/C	LUN-5	Lunar Sample Return	CE	11 500	24.0/10.0	—	11 500	24.0
23	KSC	Delta 300	Ast-1A	Explorer - LEO	CE	462	9.9/2.6	297/297/28.5	462	9.9
24	KSC	Delta 300	LS-1 LS-1	Life Science Module Life Science Module	LCE LCE	491 491	10.7/2.2 10.7/2.2	300/300/28.5 300/300/28.5	982	21.4
25	KSC	TIID-7/BII	LOG-MOD	Logistic Module	LCE	26 300	28.0/14.0	270/270/55	26 300	28.0
26	WTR	TIIB/C	NN-D-11	Earth Resources Sat. - LEO	LCE	6 630	36.1/10.2	500/500/97	6 630	36.1
27	WTR	TIIB/C	EO-8(1)	Earth Obs. Sat.	LCE	4 758	13.5/12.2	500/500/98	4 758	13.5
28	WTR	TIIB/A	Ast-10(6)	Explorer	LCE	4 075	13.0/11.3	200/200/90	4 075	13.0

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Continued)

Flight No.	Launch Site	Launch Vehicle	Payload							Cargo	
			Code	Name	Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)	
29	KSC	TIIB/A	NN/D-16 C(2)	Com./Nav.	LCE	4 758	13.5/12.3	200/200/28.5	4 758	13.5	
30	KSC	TIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8	
31	KSC	TIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8	
32	KSC	TIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8	
33	KSC	TIIM	BIG G/CPM	BIG G/CPM - Crew Rotation and Log	LCE	36 000	42.8/15.8	270/270/55	36 000	42.8	
34 <sub>D</sub>	WTR										
35 <sub>D</sub>	WTR										
36 <sub>D</sub>	WTR										
37 <sub>D</sub>	WTR										
38 <sub>D</sub>	WTR										
39 <sub>D</sub>	KSC										

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

TABLE 5. EXPENDABLE L/V CARGO MANIFEST (Concluded)

Flight No.	Launch Site	Launch Vehicle	Code	Name	Payload				Cargo	
					Type	Weight (lb)	L/D (ft/ft)	Orbit HA/HP/INC (n. mi./n. mi./deg)	Weight (lb)	Length (ft)
40 <sub>D</sub>	KSC									
41 <sub>D</sub>	KSC									
42 <sub>D</sub>	KSC									
43 <sub>D</sub>	WTR									
44 <sub>D</sub>	WTR									
45 <sub>D</sub>	WTR									
46 <sub>D</sub>	WTR									
47 <sub>D</sub>	WTR									
48 <sub>D</sub>	WTR									
49 <sub>D</sub>	WTR									
50 <sub>D</sub>	WTR									

Notes: Subscript D = DoD flight.

Flight numbers do not represent a priority or a sequence of flights.

**TABLE 6. EXPENDABLE LAUNCH VEHICLE TRAFFIC SUMMARY  
BEST MIX EXPENDABLE PAYLOADS  
NASA/NON-NASA**

EXPENDABLE LAUNCH VEHICLE	LAUNCH SITE	NO. OF LAUNCHES												
		80	81	82	83	84	85	86	87	88	89	90	91	TOTAL
SCOUT	KSC WTR	4 2					4 2							8 4
DELTA 300	KSC WTR	2 2	3 5	2 2	2 0	2 2	2 2	3 3	2 2	2 3	2 1	3 5	2 3	27 30
DELTA 900	KSC WTR	1	0	1	1	0	0	0	1	0	0	0	0	4
DELTA 304	KSC WTR	1	1	0	1	1	1	0	1	1	1	1	1	10
DELTA 904	KSC WTR			1			2		2			2		6 1
TIID/C	KSC WTR	5	3	6	3	5	3	1	1	3	5	3	5	2 48
TIID7	KSC WTR	5	0	1	0	1	2	4	1	0	3	0	1	18 6
TIID/A	KSC WTR	5	2	4	7	5	3	6	5	7	4	5	4	57 14
TIID/C/BII	KSC WTR	1	2	0	1	0	1	1	0	0	0	0	0	6
TIID	KSC WTR	1 1	1	2	2	3	1	2	1	2	0	4	1	20 1
TIID/BII	KSC WTR	1		1		1		1		1		1		6
TIID/C	KSC WTR	4	6	3	8	4	5	7	8	7	8	9	8	76
TIIM	KSC WTR	2	4	4	4	4	4	4	4	4	4	4	4	46
TIID7/BII	KSC WTR	1	1	1	1	1	1	2	1	1	1	1	1	13
TIID7/C	KSC WTR	0	2	0	0	2	0	0	1	0	1	0	1	7
TIID7/C/BII	KSC WTR	1	1	0	0	2	4	2	0	1	0	1	1	13
TIIC	KSC WTR	1 1	2 1	3 1	1	4 1	2 1	3 1	1	3 1	2 1	3 1	1	6
TOTAL		40	33	31	31	38	43	47	37	41	32	48	33	454

TABLE 7. EXPENDABLE LAUNCH VEHICLE TRAFFIC SUMMARY  
BEST MIX EXPENDABLE PAYLOADS, NASA/NON-NASA/DOD

		LAUNCH SITE	NO. OF LAUNCHES												
			80	81	82	83	84	85	86	87	88	89	90	91	TOTAL
DOD	KSC	KSC	8	3	6	7	10	4	5	7	7	4	9	3	
		WTR	14	12	12	16	11	17	12	13	12	15	10	14	
	SUB-TOTAL		22	15	18	23	21	21	17	20	19	19	19	17	231
NASA NON- NASA	KSC	KSC	29	25	21	25	31	32	36	27	29	26	34	25	
		WTR	11	8	10	6	7	11	11	10	12	6	14	8	
	SUB-TOTAL		40	33	31	31	38	43	47	37	41	32	48	33	454
SUB-TOTAL			62	48	49	54	59	64	64	57	60	51	67	50	685
ABORT FLIGHTS			6	5	5	5	6	6	6	6	6	5	6	5	67
TOTAL			68	53	54	59	65	70	70	63	66	56	73	55	752

## APPENDIX

### EXPENDABLE LAUNCH VEHICLE FLEET CHARACTERISTICS

Table A-1 lists the expendable launch vehicles used in this analysis. Included is a brief description of each vehicle with its size and payload performance given either to a 270 n. mi. circular orbit or to synchronous equatorial orbit.

Even though some of the vehicles have not been developed, it was determined that this was the least costly fleet, even with the consideration and inclusion of the development costs, where required. The Titan III was the basic launch vehicle. The Atlas/Centaur was a candidate launch vehicle, however, it was not cost effective due to the high launch rate of the Titan.

The undeveloped launch vehicles are considered to be within the current technology capability.

TABLE A-1. DESCRIPTION AND CHARACTERISTICS OF THE EXPENDABLE LAUNCH VEHICLES USED

Launch Vehicle	Description	Typical Payload Capability (1) lb	Total Launch Vehicle Length (2) ft	Launch Vehicle Diameter (3) ft
SCOUT	4-stage guided booster using SRMs capable of launching low mass payloads on orbital, re-entry, and probe missions	340 1a	22.9	3.3
Delta 300	2-stage storable propellant booster with 3 Caster II augmentation motors on standard long tank Thor with standard second stage for small to medium payloads	2500 1a	106.3	8.0
Delta 304	Delta 300 plus TE 364-4 motor third stage	435 1b	106.3	8.0
Delta 600	same as Delta 300 except with 6 Caster II augmentation motors	2750 1a	106.3	8.0
Delta 604	Delta 600 plus TE 364-4 motor third stage	475 1b	106.3	8.0
Delta 900	same as Delta 300 except with 9 Caster II augmentation motors	3600 1a	109.5	8.0
Delta 904	Delta 900 plus TE 364-4 motor third stage	520 1b	109.5	8.0
T-III B/A	standard two stage (Core I and Core II) storable propellant booster for medium payloads plus storable propellant Agena third stage	820 1b	156	10.0
T-III B/C	Tital III B plus cryogenic Centaur third stage	1100 1b	156	10.0

TABLE A-1. DESCRIPTION AND CHARACTERISTICS OF THE EXPENDABLE LAUNCH VEHICLES USED (Continued)

Launch Vehicle	Description	Typical Payload Capability (1) lb	Total Launch Vehicle Length (2) ft	Launch Vehicle Diameter (3) ft
T-III B/C/BII	Titan III B/C plus SRM Burner II fourth stage	1800 1b	164	10.0
T-III C	standard Core I and Core II booster plus storable propellant Transtage third stage with two strap-on 5-segment, 120-inch diameter SRMs for boost augmentation	2900 1b	180	10.0
T-III D	same as T-III C except Transtage removed	17000 1a	154	10.0
T-III D/BII	Titan III D plus Burner II stage	27000 1a	154	10.0
T-III D/C	Titan III D plus Centaur stage	7600 1b	154	10.0
T-III D/C/BII	Titan III D plus Centaur and Burner II stages	7600 1b	154	10.0
T-III D7	New booster requiring development of a new stretched Core I and two new 7-segment, 120-inch SRMs for boost augmentation with existing standard Core II	28500 1a	164	10.0
T-III D7/BII	Titan III D7 plus Burner II stage	3400 1b	164	10.0
T-III D7/C	Titan III D7 plus Centaur stage	10200 1b	164	10.0

TABLE A-1. DESCRIPTION AND CHARACTERISTICS OF THE EXPENDABLE LAUNCH VEHICLES USED (Concluded)

Launch Vehicle	Description	Typical Payload Capability (1) lb	Total Launch Vehicle Length (2) ft	Launch Vehicle Diameter (3) ft
T-IID7/C/BII	Titan III D7 plus Centaur and Burner II stages	10200 1b	164	10.0
T-IIIIM	New booster requiring development of a man-rated version of Titan III D7	36000 1a	180	10.0

NOTES:

- (1) (a) launched due East into 270 Nautical mile circular orbit  
 (b) synchronous equatorial orbit
- (2) overall launch vehicle length with standard payload fairing
- (3) nominal launch vehicle diameter of primary (core) stages.

## APPROVAL

### THE OCTOBER 1973 EXPENDABLE LAUNCH VEHICLE TRAFFIC MODEL

By Shuttle Utilization Planning Office

The information in this report has been reviewed for security classification. Review of any information concerning Department of Defense or Atomic Energy Commission programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.

This document has also been reviewed and approved for technical accuracy.

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